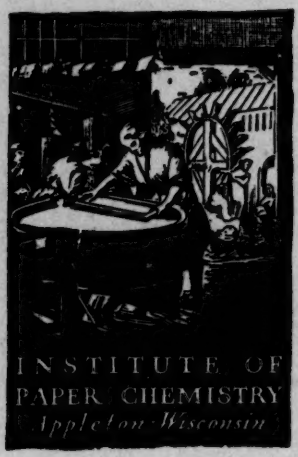
PAGES 153-226

BULLETIN

OF

THE INSTITUTE OF PAPER CHEMISTRY



AFFILIATED WITH

LAWRENCE COLLEGE

APPLETON, WISCONSIN

LIBRARY NOTES

NOVEMBER · 1949

Volume 20 Number 3

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Books and Pamphlets Added to the Library During October

ATLASES

RAND MCNALLY & COMPANY. Rand McNally cosmopolitan world atlas. Chicago, etc., Rand McNally [c1949] 335 p.

BIOLOGICAL CHEMISTRY

ANNUAL REVIEW of biochemistry. J. Murray Luck, editor; Hubert S. Loring and Gordon Mackinney, associate editors. Stanford, Annual Reviews, Inc., 1949. v. 18. 739 p.

CANADA—STATISTICS

CANADA. *Dominion Bureau of Statistics.* The Canada year book, 1948-49; the official statistical annual of the resources, history, institutions, and social and economic conditions of the dominion . . . Ottawa, Edmond Cloutier, King's printer . . . 1949. 1267 p.

CHEMISTRY—YEARBOOKS

CHEMICAL SOCIETY, *London.* Annual reports on the progress of chemistry for 1948. London, The Society, 1949. 379 p.

CHEMISTRY, ORGANIC

ORGANIC REACTIONS. Roger Adams, editor-in-chief. New York, Wiley [c1949] 446 p.

WHELAND, G. W. Advanced organic chemistry. 2d ed. New York, Wiley [c1949] 799 p.

CHEMISTRY, PHYSICAL AND THEORETICAL—LABORATORY MANUALS

WEISSBERGER, ARNOLD, ed. Physical methods of organic chemistry. 2d compl. rev. and augm. ed. New York, Interscience Publishers, 1949. Part 1. 1072 p.

CLAY

HUBER, J. M., CORPORATION. Kaolin clays and their industrial uses. New York, The Corporation [c1949] 141 p.

DIFFUSION

BENEDICT, MANSON, and WILLIAMS, CLARKE, ed. Engineering developments in the gaseous diffusion process. New York, McGraw-Hill Book Co., 1949. 129 p.

EMULSIONS

CARBIDE AND CARBON CHEMICALS CORPORATION. Emulsions and detergents. 8th ed. New York, The Corporation [c1949] 72 p.

ENZYMES

LARDY, HENRY A., ed. Respiratory enzymes, by Laurens Anderson [and others] of the University of Wisconsin, Madison, Wisson [Rev. ed.] Minneapolis, Burgess Publ. Co. [c1949] 290 p.

FORESTS AND FORESTRY

CRAIG, RONALD B. Virginia forest resources and industries. U. S. Dept. of Agriculture. Miscellaneous publication no. 681. Washington, U. S. Govt. Print. Off., 1949. 64 p.

HEAT—TRANSMISSION

HEAT TRANSFER and Fluid Mechanics Institute, 1949. These papers, presented at the June 22-24, 1949 meeting held at the University of California, Berkeley, have been reprinted and distributed in this form in order to aid in the effectiveness of the meeting [New York] The American Society of Mechanical Engineers, c1949. 278 p.

PAPER MAKING AND TRADE—BIBLIOGRAPHY

WEST, CLARENCE J., comp. Pulp and paper manufacture; bibliography and United States patents 1948. New York. Technical Association of the Pulp and Paper Industry, 1949. 262 p.

PATENTS

AMERICAN CHEMICAL SOCIETY. Collective numerical patent index to Chemical Abstracts, volumes 31-40, 1937-1946. Washington, The Society [c1949] 182 p. *cf.* B.I.P.C. 15:151.

PERFUMERY

MONCRIEFF, R. W. The chemistry of perfumery materials. London, United Trade Press Ltd., 1949. 344 p.

PLASTIC MATERIALS

BAKELITE CORPORATION, *New York*. Bakelite molding materials; technical data. New York, The Corporation [1949-] Looseleaf.

RESEARCH

BRYANT, LYLE C. 1947-48 survey of university business and economic research projects, a compilation of studies in business and economics recently completed or in process in the university schools of business and departments of economics [U. S. Department of Commerce. Washington, Govt. Print. Off., 1949] 240 p.

STATISTICS

U. S. OFFICE OF DOMESTIC COMMERCE. *Chemicals Division,* comp. Chemical statistics directory no. 2; an index to Government statistics of the chemical industry for 1946-47. Washington, U. S. Govt. Print. Off., 1949. 71 p. *cf.* B.I.P.C. 17:681.

SURVEYING

MORRIS, FRED C. Your land; surveys, maps & titles. Bulletin of the Virginia Polytechnic Institute. Engineering Experiment Station Series bulletin no. 71 [Blacksburg, Va., The Institute, c1949] 95 p.

SWELLING AND HYDRATION

ROLLINS, MARY L., FORT, HAZEL H., and SKAU, DOROTHY B., comp. Cellulose-water relations: a selected bibliography with special reference to swelling of cotton and to its utilization in water-resistant fabrics. U. S. Dept. of Agriculture Library. Library list no. 44. Washington, The Library, 1949. 63 p.

TRADE DIRECTORIES

CHEMICAL ENGINEERING catalog; the process industries' own catalog of equipment and engineering materials, 1949-50. 34th ed. New York, Reinhold [c1949] 1580 p.

TREES

CANADA. DEPARTMENT OF MINES AND RESOURCES. *Dominion Forest Service.* Native trees of Canada. 4th ed. Bulletin 61 [Ottawa, Edmond Cloutier, King's printer . . . 1949] 293 p.

WOOD—DECAY

SCHEFFER, THEODORE C. Decay resistance of black locust heartwood. U. S. Dept. of Agriculture. Technical bulletin no. 984. Washington [U. S. Govt. Print. Off., 1949] 37 p.

Survey of Periodical Articles

The following are abstracts of opinions expressed by writers in the technical journals. The Institute of Paper Chemistry takes no responsibility for the opinions here summarized.

ACID RESISTANT MATERIAL

KLOUMAN, G. H. Stainless steel research protects paper quality. Paper Mill News 72, no. 42: 23-4 (Oct. 15, 1949).

Special-purpose stainless steels which meet many of the demands of the pulp and paper industry, such as corrosion resistance, high strength, and hard, easily cleaned surfaces, ensure long service, low maintenance costs, and the protection of quality. The amount of stainless steel now purchased annually by paper mills and equipment manufacturers is almost double that of 1940 and continues to increase in spite of the drop in mill construction and the production of new machinery. Among the new developments of the Armco Steel Corp. are Types 304 ELC and 316 ELC with a maximum carbon content of 0.03% and Armco 17-4 PH, a chromium-nickel stainless steel especially recommended for parts where great hardness, strength, and corrosion resistance are necessary. R.R.

ADHESIVES

BAYER, CARL. Rubber adhesives in paper conversion. Allg. Papier-Rundschau no. 10: 486-7 (Sept. 15, 1949). [In German]

Brief reference is made to the advantages of quick-drying rubber adhesives to be applied cold for laminating paper and board in the manufacture of folding boxes, board and metal foils, and different sheets for vaporproof food packages. Recent developments include highly concentrated glues with low solvent percentages, such as the PLANA gumming procedure, for which patent application has been made (no details given). E.S.

KÖHLER, RUDOLF. Adhesives for the paper-converting industry. Allg. Papier-Rundschau no. 10: 482-5 (Sept. 15, 1949). [In German]

Following a few general remarks on adhesives for the paper-converting industry and the theory of adhesion, starch and dextrin adhesives, water-soluble cellulose ethers, and synthetic polymerization products are reviewed. E.S.

LOETTERLE, F. R. Gluing cartons and shipping containers. Univ. Illinois Bull. Eng. Exp. Sta. Circ. Ser. No. 56: 236-9 (April, 1949).

The fact that 30.8% of all damage to material packed in fiberboard shipping containers results from unsealed container flaps emphasizes the importance of properly sealing all shipping containers. Pertinent carrier rules are cited. Proper gluing depends on the correct selection and use of the adhesive. The correct selection must be based on the type of box liner, the sealing method, compression time, and the conditions to which the sealed container

will be exposed. The various types of liners and their glue requirements are considered, the outstanding advantages of glue sealing are outlined, and suggestions are given for handling and using glue. In conclusion, mention is made of palletizing adhesives for eliminating the shifting of containers in transit. R.R.

MOSES, SAUL. The nature of adhesion. Ind. Eng. Chem. 41, no. 10: 2338-42 (October, 1949).

Analysis of the data on the adhesion of polystyrene, VYHH (copolymer of vinyl acetate and vinyl chloride), and methyl methacrylate systems to aluminum alloys has shown that adhesion in the cases investigated depends on the presence of a fluid, or quasi-fluid, or mobile state at or near the film-metal interface. The data, obtained by the new technique in measuring adhesion by ultrasonic vibrations, represent adhesion as defined in the paper by Moses and Witt (*cf.* abstract below). An explanation of simple examples is offered in support of the concept of mobility. The general picture of mobility is now being developed for all types of adhesion between the various organic systems and substrata. 6 tables and 6 figures. E.S.

MOSES, SAUL, and WITT, R. K. Evaluation of adhesion by ultrasonic vibrations. Ind. Eng. Chem. 41, no. 10: 2334-8 (October, 1949).

A direct quantitative method for measuring adhesion of organic coatings to both metal and nonmetal substrata is described. The method and apparatus utilize an electrodynamic system for producing longitudinal ultrasonic vibrations in a metal cylinder. An organic film attached to the free end of the vibrating cylinder separates from the metal when the force caused by acceleration exceeds the adhesion force at the interface. The accelerating force is determined by the frequency and the amplitude of vibration. The method promises to be readily applicable to many types of material other than those used in this investigation. At present it appears to have a wide utility in the study of the adhesion of two materials as in protective coatings and in bonding adhesives. More work is necessary before the limits of this method can be adequately determined with respect to thin films. 5 figures and 5 references. E.S.

ADVERTISING

ANON. Carrier bags as advertising medium. Allg. Papier-Rundschau no. 10: 495-7 (Sept. 15, 1949). [In German and Swedish]

Illustrated examples of different German carrier bags are given. E.S.

GLASS, D. L. Merchandising aspects of fibreboard containers. Univ. Illinois Bull. Eng. Exp. Sta. Circ. Ser. No. 56: 156-8 (April, 1949).

The author discusses points which should be considered in container development, such as a convenient location of identification, clear marking, good stacking qualities, repetition of name or trade-mark, and possible use of the container for display racks and as a tool for helping the salesman demonstrate the product. R.R.

ALCOHOL

SKEEN, JOHN R. Ethyl alcohol. II. Chem. Eng. 56, no. 10: 314, 316, 318 (October, 1949); *cf.* B.I.P.C. 20: 69.

The war-created problems and the present situation in the industrial alcohol market are discussed, with particular reference to the growing competition between the fermented and synthetic product. Many hold the opinion that the latter will capture most of the future market. The record of sulfite and wood waste operations appears to be unpromising except under unusual conditions. Two tables with statistical information for the period 1935-1949/50 are included. E.S.

ALKALINE PROCESSES

MURTO, JAAKKO O. Possible modifications of the sulfate cooking process. Finnish Paper Timber J. 31, no. 17: 307-8 (Sept. 15, 1949). [In Finnish; English summary] *cf.* B.I.P.C. 20: 200.

The influence of certain less known modifications of the sulfate cooking of pine and birch pulps on the technological properties of the resulting papers has been studied at the Central Laboratory. In these experiments, the hemicellulose content of the sulfate pulp has either been considerably increased by the addition of elemental sulfur or reduced by prehydrolysis with water. Further studies are planned on the bleaching of these pulps and on the influence of the different hemicellulose contents on the opacity of papers. The complete results will be published when the investigations have been concluded. The research on the quality of sulfate pulpwood has recently been completed. E.S.

ALUMINUM CHLORIDE

PORTER, C. C., and LANE, WILLIAM H. Aluminum chloride as an alum substitute. Tappi 32, no. 10: 465-7 (October, 1949).

Aluminum chloride has not been employed heretofore on a commercial scale for the setting of rosin size because it is much more expensive than alum. However, aluminum chloride is widely used in the chemical and petroleum industries and is potentially available as a by-product from many operations in the form of a concentrated aqueous solution suitable for use in papermaking. Such an aluminum chloride solution has been used in extended mill trials on a cylinder machine making a variety of kraft specialties. The degree of sizing obtained was equivalent in every respect to that ordinarily obtained with alum, there was no resultant change in the operation of the paper machine, and there was no unusual corrosion of machine parts. Two important improvements resulted from the use of aluminum chloride in place of alum: (1) the color of the product was much better, and (2) the efficiency of the melamine resin used for abrasion resistance and wet strength was so markedly improved that 1% gave essentially the same results as ordinarily obtained with 2.5% in the presence of alum. 8 references. E.S.

ASPEN

MCGOVERN, J. N., BROWN, K. J., and KRASKE, W. A. Experiments on water and steam cooking of aspen. Tappi 32, no. 10: 440-8 (October, 1949); *cf.* B.I.P.C. 20: 114-15.

Aspen (*Populus tremuloides*) chips were subjected to water and steam cooking and oven heating before fiberizing the treated chips mechanically at atmospheric pressure to produce pulps in the yield range of 72 to 96%. Variables of time, temperature, ratio of water to wood, and wood moisture were studied. For water cooking, the following results were obtained: (1) pulp yield decreased in an orderly way with increasing temperature from 150 to 180° C. and increasing time from 0 to 60 minutes; (2) the rate of pulping as measured by pulp and lignin yields was rapid to a yield of nearly

75% and then was slow; (3) decreasing the ratio of water to wood from 6 to 2 resulted in decreased pulping time for the same yield; (4) maxima in strength properties were shown at yields of 80 to 85% independent of pulping conditions; and (5) lignin and carbohydrates were removed in nearly constant down-to-pulp yields of nearly 75%. For steam cooking, the relations of yield to time and temperature of pulping, pulp composition, and pulp strength were about the same as for water cooking. Oven heating of chips at temperatures of 170 to 200° C. in the absence of water degraded the pulps so that their strengths were below those from untreated wood and caused a conversion of carbohydrates into ligninlike material in proportion to the severity of the treatment. Pulps produced in yields of 81 to 84% by water and steam cooking, respectively, were made into corrugating boards which had strength properties equaling or approaching those of commercial hardwood semichemical corrugating board and which corrugated satisfactorily. 7 tables, 11 figures, and 12 references. E.S.

ASSOCIATIONS

ANON. British paper and board. Progress of Research Association. Indian Pulp & Paper 4, no. 1: 35-8 (July, 1949); *cf.* B.I.P.C. 19: 530.

A summary is given of the progress made on the research building of the Research Association of the British Paper & Board Industry during the past two years. The principal research problems are briefly considered. R.R.

BACHMANN, ALBERT E. A cost engineering program for TAPPI. Tappi 32, no. 10: 14A, 16A, 18A, 20A (October, 1949).

The need for a cost engineering committee of TAPPI is emphasized. E.S.

MACDONALD, R. G. Local sections in a professional society. Tappi 32, no. 10: 74A, 76A (October, 1949).

The author discusses the important part played by the local sections in serving the entire Association by referring to the excellent job done by the Pacific Section of TAPPI, the first local section, which was organized in 1929. E.S.

PULP & PAPER. Experts review technical sessions in Portland for Pulp & Paper readers. Pulp & Paper 23, no. 11: 33, 42, 45-6, 48, 50, 52, 54, 56, 58, 60, 62, 91 (October, 1949).

The technical sessions at the TAPPI fall meeting at Portland, Ore., September 11-15, 1949, are covered by the following reports, entitled "A review and appraisal": Booth, Kenneth G. Sulfite pulp session, p. 42, 45, 91; Hull, James H. Kraft pulp session, p. 46, 48; Barton, John S. Papermaking session, p. 50, 52; Hull, James H. Engineering session, p. 52, 54; Booth, Kenneth G. Pulpwoods symposium, p. 56, 58; and Barton, John S. Fundamental research, p. 60, 62. E.S.

BARKERS AND BARKING

GARDFORS, G. The barking of wood for bleached sulfite pulp. Svensk Papperstidn. 52, no. 16: 399-400 (Aug. 31, 1949). [In Swedish]

The present bleaching techniques have advanced to such an extent that, when a more or less strong alkali treatment is included in the bleaching

steps, the barking of the wood need not be as careful as in the case of unbleached pulp. The wood should be stored in the wood yard in barked condition and, according to the length of the logs, long barking drums, the Åström barker, or short barking drums should be employed. The long barking drums are suitable for floated unbarked and rossed wood. If the floated wood has not been lying in the water for any length of time, some of the bark may still adhere when the logs emerge from the barking drums; however, this will not do any harm on storage. Before such wood is finally sent to the chippers, it should be treated in the short barking drum after passing some kind of sorting arrangement, so that clean wood will by-pass the second drum barking. This is followed by the final cleaning by hand, and the cost of this operation will depend upon the thoroughness with which defects are removed. E.S.

WÅHLIN, B. The barking of wood for strong sulfite pulp. Svensk Papperstidn. 52, no. 16: 396-8 (Aug. 31, 1949). [In Swedish]

The author describes knife barkers, barking drums, the Åström barker, and hydraulic barking (Allis-Chalmers Streambarker), and the advantages, disadvantages, and cost of each method, as they apply to Swedish conditions. The wood for unbleached sulfite must be barked clean and all knots, ingrown bark, and similar defects carefully removed. Knife barkers will always be needed for the final cleaning; for the removal of heavy bark damages, they may be the only solution. The barking drum is the best equipment for floated or nondried wood. Hydraulic barking should be of value for complementing the work of the drum barker, particularly for nonfloated wood. There exists at present only one Streambarker installation in Sweden and sufficient experience is not available. The Åström barker is most suitable for unbarked green or floated wood, although it does not replace the barking drum. The operating cost is lowest for the Åström barker, followed by the barking drum, knife barker, and hydraulic barking. E.S.

BEATING

GALLAY, WILFRED. Some factors in the strength of paper. Tappi 32, no. 10: 457-62 (October, 1949).

The structure and physical properties of pulp fibers are discussed with special reference to a comparison of cellulose with a general range of linear polymers showing a close integration in this general field. The question of pre-existence of fibrils and other fine structures in the fiber is examined and an alternative interpretation of these bodies is preferred. The meaning of limited swelling in linear macromolecules in general, and in cellulose fibers in particular, is discussed, and the importance of the degree of swelling of a pulp fiber is emphasized. True adsorption is sharply differentiated from general imbibition, kinetically and thermodynamically. The possible effects of varying degrees of colloidal swelling on the beating process and on the strength of the paper are discussed. Mechanical disorganization of the structure at the surface of the fiber and of the whole fiber is discussed in relation to bonding and paper strength. Requirements in suitable extraneous bonding materials or adhesives for pulp fibers are discussed. Attention is drawn to the possibility of failure within the fiber rather than in the adhesive layer. 15 references. E.S.

BLEACHING

GUSTAFSSON, G. RURIK. The oxidation of sulfite pulp during

afterbleaching. Finnish Paper Timber J. 31, no. 17: 308-9 (Sept. 15, 1949). [In Swedish; English summary] *cf.* B.I.P.C. 20: 200.

Reference is made to the study of the effect of bleaching on the oxidation of dissolving sulfite pulps at the Central Laboratory; the relationship of standard viscose pulp to pH, chlorine addition, and temperature during the afterbleach stage received first consideration. The oxidation was followed chiefly by determination of the copper number and the carboxyl content, the latter according to a somewhat modified Wilson method (*cf.* B.I.P.C. 18: 508-9) and the Weber methylene blue method (*cf.* B.I.P.C. 17: 618-19). The present data confirm earlier results obtained with cotton linters and indicate that the oxidation rate depends to a great extent upon the pH during the afterbleach stage. At a pH of about 10, irrespective of chlorine addition and temperature, a pulp with low copper number, high carboxyl number and α-cellulose content, and a high whiteness results; the viscosity is about the same as that obtained by bleaching at pH 2. E.S.

BOARD MILLS

ANON. Fairfield Paper's new mill. Fibre Containers 34, no. 9: 28, 30, 32 (September, 1949); *cf.* B.I.P.C. 19: 689.

An illustrated description of the new mill No. 3 of the Fairfield Paper & Container Co., Baltimore, Ohio, is given, including the stock preparation system, the new 5-cylinder board machine (The General), a new boiler, and a modernized feed-water treatment system. E.S.

ANON. Modernization at Empire Box Corporation. Fibre Containers 34, no. 9: 52, 56-8 (September, 1949); *cf.* B.I.P.C. 19: 758.

The description is identical with that given in the previous reference; the present article is supplemented by six illustrations. E.S.

ANON. Sonoco makes nine-point corrugating board from semichemical pulp. Paper Ind. 31, no. 7: 818-24 (October, 1949); *cf.* B.I.P.C. 18: 538.

The latest expansion program of the Sonoco Products Co. of Hartsville, S.C., included, among other features, a new woodyard, a modernized semichemical pulp mill, and a new No. 8 Fourdrinier board machine. An illustrated description of the new equipment is given. The operating cycle of the pulp mill consists of the neutral sulfite semichemical cook of gumwood chips, discharge of the cooked chips by means of a leach caster to a drag conveyor, mechanical pulping in two Sprout-Waldron disk refiners, washing, secondary refining in two Sprout-Waldron disk refiners and a No. 6 Miami jordan, and passage through Oliver combination deckers and savealls to the stock chest. The furnish consists of about 20% waste paper, 15% broke, and the balance semichemical gumwood pulp. Details of the waste-paper stock preparation and the board machine are given. The Fourdrinier and press section were built by Downingtown; the complete drier section, reel, rewinder, and mechanical sectional drives for the entire machine were supplied by Bagley and Sewall. The Ohio Boxboard Co. and the Hankins Container Corp. each furnished one quarter of the capital needed to build the mill; both companies have a 15-year contract for the entire output of the No. 8 machine as an assurance of a continuous supply of containerboard. E.S.

CASEIN

GORDON, WILLIAM G., SEMMETT, WILLIAM F., CABLE, ROBERT S., and MORRIS, MYRON. Amino acid composition of α-casein and β-casein. J. Am. Chem. Soc. 71, no. 10: 3293-7 (October, 1949); *cf.* B.I.P.C. 15:84.

A comparative analysis of the amino acid composition of whole casein and its two major components, α-casein and β-casein, has been made. Within the experimental error of the analytical methods, all the nitrogen of each protein has been accounted for in terms of known amino acids and amide nitrogen. α-Casein and β-casein differ considerably in their content of many amino acids, and these differences are reflected in such physical properties as solubility and electrophoretic mobility. Although heterogeneous, whole casein is a fairly well characterized protein with respect to amino acid composition. 53 footnotes. E.S.

CELLOPHANE

THE DOBECKMUN COMPANY, *Cleveland, Ohio.* "Trap-door" perforated cellophane new major development in "breathing" films for packaging of fruits, vegetables. Packaging Parade 17, no. 201: 55 (October, 1949); Modern Packaging 23, no. 2: 106 (October, 1949); Food Inds. 21, no. 11: 1618 (November, 1949).

A new development in breathing films for produce packaging consists of a series of thin horseshoe die cuts down the side plies of bags and over the center of overwrapped roll stock which creates small trap doors which normally remain closed, but respond to pressure from the carbon dioxide formed within the package, release the gas and, at the same time, allow fresh air to enter. The strength and inherent moistureproof properties of the film are little changed by the perforations. The perforated cellophane is no more expensive than the plain product and less expensive than special breathing film. R.R.

MADRAS, S., MCINTOSH, R. L., and MASON, S. G. A preliminary study of the permeability of cellophane to liquids. Can. J. Research 27 B, no. 9: 764-79 (September, 1949).

The permeability of swollen cellophane accommodated by solvent exchange to a variety of liquid permeants has been studied. The degree of swelling, as measured by the thickness, has been shown to be retained when the swelling agent is removed by solvent exchange. Progressive swelling causes a controllable increase in the permeability to a given liquid, but the permeability coefficient K at a given thickness is specific for the liquid. For water and aqueous solutions, K is about five times that of organic permeants. Values for the organic liquids are all of the same order of magnitude and show systematic variation with the degree of swelling. For homologous series of alcohols and ketones, K decreases with increasing chain length. Attempts to calculate the effective pore radius and pore number from K and the void fraction were successful only for water and dilute sodium hydroxide solutions, where a radius of 1.5×10^{-7} cm. and a pore number of 10^{15}/sq. cm. were obtained. An independent method based on combined permeability and electrical conductance yielded a value of 3×10^{-7} cm. for the effective pore radius. With organic permeants, it is believed that complications introduced by swelling invalidate the application of the equations. The results obtained can be explained on the basis of viscous flow of the liquids through a porous network in which the number and dimensions of the pores vary with the degree of swelling, but evidence in favor of the validity of this mechanism is inconclusive. 17 references. E.S.

CELLULOSE

BREĬTVEĬT, K. V. Cross linkages in fibers and interfiber linkages in paper. Bumazh. Prom. 24, no. 4: 6-13 (July-August, 1949). [In Russian]

The arrangement of parallel cellulose chains (random and ordered overlapping, nonoverlapping) and the distribution of chain molecules in the cellulose fiber are illustrated; structural representations of cross linkages between adjacent amylene oxide rings (*cf.* B.I.P.C. 16: 221) and of branched and unbranched starch chains are also given. 17 footnotes. E.G.S.

CELLULOSE—DEGRADATION

MEHTA, P. C., and PACSU, EUGENE. Cellulose studies. XI. Acetal type of methoxyl group in methanolyzed celluloses. Textile Research J. 19, no. 10: 625-30 (October, 1949); *cf.* B.I.P.C. 19: 9.

Native cotton and commercial viscose rayon were degraded by using a saturated solution of hydrogen chloride (about 43%) in methanol at 0° C. It was found that, on the average, 8.1 bonds in native cotton suffered methanolysis during the first six hours of the reaction, whereas in the ensuing period of 666 hours only 1.6 bonds were cleaved. The results indicate that the initial reaction comes to a virtual standstill after about the same stage of degradation has been reached as in the mild hydrolytic scission of the same materials (D.P. ~ 250 for cotton, and D. P. ~ 60 for viscose rayon). To gain information on the nature of the methoxyl groups in the methanolyzed products, a study of the rate of hydrolysis of the latter was made. Evidently, if the classical concept of cellulose structure is correct—that is, if only normal methyl glucopyranoside end-groups are present—then the rate of acid hydrolysis, as measured by the increase in the reducing power, should be of the order of magnitude shown by the normal methyl glucopyranosides. On the other hand, a very fast rate of hydrolysis, which is characteristic for the open-chain dimethyl acetals of the sugars, would constitute evidence of the presence of such residues; hence, it would favor the new concept of cellulose structure. The results showed that more than one half of the material in the cases of viscose rayon and native cotton was hydrolyzed by 0.05*N* hydrochloric acid at 60° C. in a period of 48 hours, which is considerably shorter than the half-life (3450 hours) of methyl α-glucopyranoside under identical conditions. These results are considered to supply the chemical proof for the presence of the acid-sensitive, open-chain residues which were suggested in the new formula for cellulose. 3 tables, 1 structural formula, 2 reaction schemes, and 13 references. E.S.

CELLULOSE—OXYCELLULOSE

ENTWISTLE, D., COLE, E. H., and WOODING, N. S. The autoxidation of alkali cellulose. Part II. Textile Research J. 19, no. 10: 609-24 (October, 1949); *cf.* B.I.P.C. 20: 74.

In the previous reference the uncatalyzed autoxidation of alkali cellulose was discussed and it was suggested that the reaction proceeds through a chain mechanism involving transient free radicals. In the present article, the effect of certain transition-metal catalysts on the kinetics of oxygen absorption and cellulose depolymerization is described. It is further shown that the reaction is subject to catalysis by substances which generate free radicals and by the presence of certain other autoxidizable substances. Silver and gold compounds behave as inhibitors, as do some typical organic antioxidants. The results provide further evidence for the free-radical chain character of the

reaction. Possible depolymerization processes are discussed in terms of this approach. 7 tables, 16 diagrams, and 23 references. E.S.

CELLULOSE ESTERS—NITROCELLULOSE

BADGER, RICHARD M., and BLAKER, ROBERT H. The investigation of the properties of nitrocellulose molecules in solution by light-scattering methods. II. Experimental results and interpretation. J. Phys. & Colloid Chem. 53, no. 7: 1056-69 (October, 1949); *cf.* B.I.P.C. 19: 761.

A series of nitrocellulose fractions covering the molecular-weight range 9400-518,000 has been investigated by light-scattering methods. The nitrocellulose molecule has been shown to be relatively stiff, and to be nearly fully extended up to a degree of polymerization $z \sim 100$. The "effective bond length" of the random coil observed at high molecular weights is roughly 50 A., about 10 times the length of the monomer unit. This conclusion is supported by diffusion data interpreted in the light of the recent Kirkwood-Riseman theory of viscosity and diffusion (*cf.* J. Chem. Phys. 16: 565-73 [1948]). This theory is, however, shown to be valid for cellulose derivatives only for D.P.'s in excess of 100. It is suggested that the validity of the simple Staudinger viscosity relation in the molecular-weight range of usual interest is somewhat accidental and results from the occurrence of a broad flat maximum of $[\eta]/z$ in this region. This maximum presumably corresponds to a transition in which the cellulose molecule loses the properties of a rod and assumes those of a random coil. 6 tables, 8 figures, and 17 references. E.S.

CELLULOSE ETHERS

SUGIHARA, J. M., and WOLFROM, M. L. 2-Methylcellulose. J. Am. Chem. Soc. 71, no. 10: 3509-10 (October, 1949).

Activated cotton linters reacted with sodium hydroxide in a nearly anhydrous medium to form an alkali cellulose, which reacted with methyl iodide to yield a methylcellulose (D.P. about 100 by nitrate viscosity) containing 1.03 methoxyl groups per anhydro-D-glucose unit. That the methylation was effected largely on C-2 results from the fact that methanolysis of the polymer followed by hydrolysis and mercaptalation yielded 2-methyl-D-glucose diethyl mercaptal as the only chromatographically isolable crystalline product. 16 footnotes. E.S.

TIMELL, TORE. Cellulose reactions. XI. The tosylation-iodination method for estimating the amount of primary hydroxyl groups in partially alkylated cellulose ethers. Svensk Kem. Tid. 61, no. 7: 146-55 (July, 1949). [In English]

The tosylation-iodination method for quantitative determination of primary hydroxyl groups in glucose, which was discovered by Oldham and Rutherford in 1932 (*cf.* B.I.P.C. 2: 207), has been widely applied in the carbohydrate field. It has been shown that it is not generally applicable to all types of carbohydrates. With cellulose esters, the comprehensive work of Malm and co-workers (*cf.* B.I.P.C. 19: 81) emphasizes the necessity of carefully controlling the experimental details. In the present work, the author has closely examined the method as applied to cellulose ethers. Partially substituted propylcellulose and ethylcellulose were used as starting materials. On the basis of these investigations it is concluded that the method gives reliable results on cellulose ethers under certain conditions only. These conditions are principally as follows: (1) The sample should be soluble in, or

at least swollen by, anhydrous pyridine. If the latter is the case, continuous and vigorous stirring during the esterification is required. Temperatures above 25° C. are to be avoided. (2) The degree of tosylation must be limited, so that the number of secondary tosyl groups does not greatly exceed half the number of primary tosyl groups. (3) The iodination must not be continued for more than two hours at 120° C. 7 tables, 6 diagrams, and 33 references. M.A.H.

WURZ, OTTO, and WURZ, ERICH. Cellulose ethers and their use in the paper industry. Das Papier 3, no. 15/16: 304-10 (August, 1949). [In German]

The production and utilization of methyl- and ethylcellulose and of hydroxyethyl glycolic acid and benzyl ethers of cellulose are described. Producers and products (with trade names) are listed for Germany, England, France, Austria, Switzerland, United States, and the Scandinavian countries. Applications in the paper industry include internal additions to the beater, surface applications, and adhesives. Reference is made to the article by Horsey (*cf.* B.I.P.C. 17: 689). L.E.W.

CELLULOSE FILMS, TRANSPARENT

BÖTTINGER, G. Transparent foils and their manufacture. Allg. Papier-Rundschau no. 10: 478-82 (Sept. 15, 1949). [In German and Swedish]

The author discusses briefly the important types of cellulose foils (viscose, cuprammonium, acetate, and nitrate), their properties, chief applications, and manufacture. Other transparent foils are made from different plastics and gelatin. 3 illustrations in the Swedish text. E.S.

U. S. DEPARTMENT OF AGRICULTURE. *Production and Marketing Administration.* Report increasing use of transparent films for packaging of rice, dry edible beans and peas. Packaging Parade 17, no. 201: 27 (October, 1949).

The trend in packages for rice, dry beans, and peas is toward the use of transparent film bags. The films used are cellulose acetate, ethylcellulose, rubber hydrochloride, polyethylene, and the polyvinyls in 300-, 450-, and 600-gage weights, singly and in combinations, and in either plain or moisture-proof heat-sealing types. Odd-sized packages are being replaced by standard sizes. A co-operative project with E. I. du Pont de Nemours and Co. is in progress to determine the best weight of single film or combination of films for each size of consumer container. R.R.

CHEMICAL TESTING—CELLULOSE—FRACTIONATION

BRYDE, Ø. Nitration as an expedient in the study of the decomposition processes of cellulosic materials. Svensk Papperstidn. 52, no. 16: 389-95 (Aug. 31, 1949). [In Norwegian; English, German, and French summaries] *cf.* B.I.P.C. 18: 149-50.

In previous experiments a nitrocellulose as pure as possible was isolated from nitrated semichemical pulps, which had been prepared by a slightly modified sulfite process. It could be demonstrated that different well-characterized fractions were obtained during the various washing and precipitation procedures and that these supplied useful information on the composition of the original pulps. In the present investigation, the same frac-

tionation was applied to pulps resulting from the previously mentioned modified sulfite cook, as well as from sodium monosulfite and sodium hydroxide pulping processes, and the individual fractions were studied. The main fractions so obtained included: the "C"-cellulose, which is removed on washing the nitrates with methanol; the "A"-cellulose, which is obtained as a precipitate when the acetone solution of the nitrates is poured into a large excess of water; and the "B"-cellulose which is not precipitated by this procedure. An insoluble fraction occurs also in samples with a high lignin content. The main purpose of the present study is the description of this fractionation method. While still in the nitrate form, the molecular properties, particularly the molecular weight, of the fractions can be ascertained; they can then be denitrated and the content of lignin and various sugars be determined by standard procedures. The present method is especially suitable for pulps which are rich in lignin and can, therefore, be applied to the study of samples withdrawn from the digester during cooking. However, it can also be used for the investigation of bleached samples. 11 figures and 19 references. E.S.

CHEMICAL TESTING—CELLULOSE—POLYDISPERSITY

WANNOW, H. A., and THORMANN, FR. Contribution to the determination of the chain-length distribution of cellulose. Kolloid-Z. 112, nos. 2-3: 94-110 (February-March, 1949). [In German]

A North American cotton was kier-boiled, washed, and degraded by alkaline hydrogen peroxide to a D.P. in cuprammonium of 296. This starting material was converted to cellulose nitrate, using a mixture of nitric acid, phosphoric acid, and phosphorus pentoxide to avoid hydrolytic degradation. The nitrate was fractionated by fractional precipitation with water from a 1% solution in acetone. Seven of the eight fractions thus obtained were refractionated; five to eight secondary fractions were obtained from each primary fraction. In this way integral and differential chain-length distribution curves were constructed for the original material and for the individual fractions. It was established that the chain lengths in the fractions are usually not distributed symmetrically around the measured average D.P. A typical fraction will consist of a principal portion of approximately uniform material and a smaller portion of nonuniform material with a lower D.P. Although the theoretical requirement of symmetry within the fraction was not met, the desired experimental result was obtained, because, for this sample (viscometric D.P. of the nitrate 350), the eight primary fractions gave the same graphical integral distribution curve as all the secondary fractions. Osmometric measurements were made on the unfractionated sample, on three of the primary fractions, and on three of the secondary fractions, so that the number average could be compared with the viscometric average D.P. For the secondary fractions and two of the primary fractions the D.P. results by the two methods were nearly the same, indicating a high degree of uniformity. From the data the Staudinger K_m constant for molecular homogeneous and almost completely substituted cellulose nitrate, in acetone, was evaluated at $10.2 \times 10^{-4} \pm 4\%$. 13 tables, 11 diagrams, and 21 references. M.A.H.

CHEMICAL TESTING—PULP—BLEACHING PROPERTIES

ÅLANDER, PAUL. Revision of the Central Laboratory method for the determination of the reddening of pulp. Finnish Paper Timber J. 31, no. 17: 310 (Sept. 15, 1949). [In Swedish; English summary] *cf.* B.I.P.C. 20: 200.

The following improvements have been incorporated in the Central Laboratory's standard method A 2011 (determination of the reddening tendency of unbleached sulfite pulp). The samples treated with hydrogen peroxide are compared with samples dipped in sodium thiosulfate (5 grams of salt/liter) instead of water. The difference in color is determined with greater accuracy by Lovibond's Tintometer scale than by reflectance readings with the Zeiss sphere reflectometer. Experiments with the Hardy spectrophotometer show that the color changes in reddening of unbleached sulfite pulp appear best as a reduction of the reflectance in the yellow-green area, with their maximum between 520 and 540 mμ. The work for developing a photometric measuring technique continues. E.S.

CHLORINE

MURRAY, R. L. The chlor alkali industry in the United States. Ind. Eng. Chem. 41, no. 10: 2155-64 (October, 1949).

The history of the industry is traced since the early experimental work preceding the first commercial installation at Griesheim Electron near Frankfort, Germany, in 1888. United States production capacity for chlorine has grown from less than 40 tons a day in five plants in 1900 to upward of 5000 tons a day in 58 plants in 1949, with an annual sales value of basic and derived products in excess of $600,000,000. World capacity for chlorine is now estimated at more than 9000 tons a day, but because of operations well below capacity in Europe and in Japan, it is estimated that United States production will be 60 to 70% of total world production by the end of 1949. The three basic processes for producing chlorine are described and the United States capacity by each is estimated. The various types and makes of electrolytic cells are classified. A map giving the location of all the chlorine plants in the United States and Canada and showing the principal chlorine-producing areas is included. The 10 largest United States chlorine producers are ranked according to size in terms of chlorine capacity. The reasons for the great increase in chlorine consumption are analyzed and the principal outlets for chlorine are mentioned. Mercury chlorine cells are compared with diaphragm cells and the differences between them are discussed. The more rapid growth of electrolytic caustic soda in comparison to ammonia-soda caustic soda is mentioned and comments are made on the future. Technological advances in the industry over the past 25 years are listed and the results of aggressive research are emphasized. A few predictions are made for the future. 2 tables, 7 figures, and 46 references. E.S.

CHROMATOGRAPHY

MARTIN, A. J. P. Partition chromatography. Ann. Repts. on Progress Chem. (Chem. Soc. London) 45: 267-83 (1948, publ. 1949).

The author reviews the literature on partition chromatography of recent years. 53 references, dating from 1940. E.S.

COLOR

WRIGHT, W. D. Color adaptation and color contrast. Rayon and Synthetic Textiles 30, no. 6: 92-4; no. 8: 84-6; no. 9: 129-32; no. 10: 85-7; no. 11: 85-6 (June, August-November, 1949).

The retina of the eye is a living organ that possesses a vast capacity to adapt itself to its environment and its response is dependent on its state of adaptation. This creates a problem when one attempts to specify the appear-

ance of a color. Color measurement in terms of the trichromatic system merely defines the stimulus mixture that will have the same color as the test pattern but does not, and cannot, define the appearance itself. The author discusses the difficulties inherent in attempting to measure the effects of different adaptation of the eye and suggests several approaches which have been used. Eye adaptation is classified into brightness adaptation and color adaptation. In both cases the author differentiates between direct adaptation resulting from the direct illumination of the part of the retina under consideration, and indirect adaptation which is the change in sensitivity of one part of the retina caused by stimulation of neighboring areas. It is the latter which is involved in the process of viewing a given color or brightness which is surrounded by a contrasting color or brightness. Adaptation of the retina produces the effect of brightness constancy under different levels of illumination. The author also discusses the question of color constancy under tungsten light and daylight and the role played by eye adaptation in maintaining this constancy. He also shows why color fails to be constant under fluorescent and line sources and why eye adaptation cannot compensate in these cases as it does between daylight and incandescent light. Quality of illumination is quite readily controlled and evaluated in the laboratory but, under normal viewing conditions, it is difficult to estimate because of the presence of many colors in rooms and out of doors which modify the quality. This makes the evaluation of the appearance of a color almost impossible when it is viewed under normal viewing conditions. The author of this series of articles has made an excellent survey of a difficult problem and has emphasized the need of a great deal of research by both physicists and psychologists. 10 diagrams. O.H.O.

COLOR-BLINDNESS

BROWN, W. R. J., and MACADAM, D. L. Visual sensitivities to combined chromaticity and luminance differences. J. Optical Soc. Am. 39, no. 10: 808-34 + 1 col. plate (October, 1949).

Color discrimination for the general case of combined chromaticity and luminance differences has been investigated by analysis of the errors of visual trichromatic colorimetry. Formulas based on those devised by Silberstein have been used to determine the coefficients and axes of ellipsoids in color space from the data. Methods for transforming the results to other co-ordinate systems are presented and used to give the results in terms of both the I.C.I. tristimulus X, Y, Z values and the I.C.I. x, y chromaticity values. Most of the results are nearly symmetrical above and below the chromaticity (constant luminance) cross section of each ellipsoid. Those cross sections are comparable with results previously published, and the agreement is satisfactory. The influence on color discrimination of changing the level of luminance has been studied for three colors. The ratio between the standard of deviation of each primary and its amount seems to be a function of only the luminance contributed by that primary to the color mixture. 9 tables, 16 figures, and 9 references. E.S.

HENDLEY, CHARLES D., and HECHT, SELIG. The colors of natural objects and terrains, and their relation to visual color deficiency. J. Optical Soc. Am. 39, no. 10: 870-3 (October, 1949).

The colors of many natural objects and terrains were determined by visual matching with samples of known spectral reflectance (Munsell's "A color notation"). There are only three important groups of colors. Foliage lies in a yellow-green region of dominant wavelength 557-574 mμ. Earths range between yellow and orange-red, 576-589 mμ. Water, sky, and distant objects

are blue, 459-486 mμ. Colors of autumn foliage spread into the yellows and reds to the end of the spectrum. The outstanding characteristic of these terrain colors is their lack of saturation, most having an excitation purity of 40% or less. Furthermore, objects quickly lose saturation with increasing distance from the observer, so that even in the clearest weather encountered no object over 3½ miles away had an excitation purity of over 11%. To the color-deficient observer these colors appear even less saturated than to the normal. In addition, the yellow-to-green region of the spectrum, where the majority of discriminations must be made, is one in which color-blind individuals show poor hue discrimination. Thus, in both hue and saturation the color-deficient person is at a decided disadvantage in discriminating terrains. 2 tables, 3 figures, and 16 references. E.S.

COLORIMETRY

JUDD, DEANE B. A comparison of direct colorimetry of titanium pigments with their indirect colorimetry based on spectrophotometry and a standard observer. J. Research Natl. Bur. Standards 43, no. 3: 227-35 (September, 1949); *cf.* B.I.P.C. 18: 666-7.

Recent work by Jacobsen in the colorimetry of titanium pigments has indicated that the I.C.I. standard observer weights too lightly the spectral region below 430 mμ to accord with visual perception by average observers. This paper presents a repetition of this work for a single pair of titanium-pigment paints whose difference was measured by spectrophotometric means and then by seven observers by means of a visual colorimeter. Four of the seven observers corroborated Jacobsen's conclusion; three checked closely the standard observer. A modified standard observer based upon the spectral luminosity determinations of Gibson and Tyndall and of Wald has been derived and is shown to account closely for the settings of the group of four observers that disagreed with the standard observer. It is suspected that if the I.C.I. standard observer is to be maintained in its present status of general acceptability for commercial colorimetry, it may have to be modified so as to weight more heavily the short-wave extreme of the spectrum. Further data relating to the luminosity of the spectrum in the wave-length region below 430 mμ should be gathered to form an adequate basis for this modification. 4 tables, 7 figures, and 10 references. E.S.

CONTAINER INDUSTRY

ANON. Self-service in department stores. Fibre Containers 34, no. 9: 94-7 (September, 1949).

The operation of the self-service housewares department of Wieboldt Stores, Inc., Chicago, is described, and the possibilities of this development for the packaging industry are discussed. This type of operation presents a challenge to the box and carton industry and several packaging suggestions are outlined. 4 illustrations. E.S.

CONTINUOUS COOKING PROCESS

RICHTER, J. Kamyr continuous cooking. Kamyr Bull. no. 8: 2-17 (April, 1949). [In English] *cf.* B.I.P.C. 19: 844.

This is essentially the same description given in the previous reference, although it contains more details and illustrations. E.S.

DIFFUSION

LAIDLER, K. J., and SHULER, K. E. The kinetics of membrane

processes. I. The mechanism and the kinetic laws for diffusion through membranes. J. Chem. Phys. 17, no. 10: 851-5 (October, 1949).

The equations for diffusion in binary systems are extended to the case of diffusion through a membrane. Three elementary rate processes are considered at a solution-membrane interface: (1) adsorption of the diffusing species, (2) desorption back into the solution, and (3) diffusion into the membrane, and an expression for the rate of constant of the over-all process of surface penetration is developed in terms of three specific rate constants. Various special cases are considered and discussed with reference to the experimental data. A general expression for the rate of diffusion of a species through a membrane under steady-state conditions is derived, the rate being expressed as a function of activities. It is shown that the application of this expression to the case of a solvent passing through a membrane which is impermeable to the solute leads to the thermodynamically exact equation for the osmotic pressure. Expressions are given for the rate of flow of solvent and solute through a membrane as a function of the osmotic and hydrostatic pressures across the membrane. 8 references. E.S.

LAIDLER, K. J., and SHULER, K. E. The kinetics of membrane processes. II. Theoretical pressure-time relationships for permeable membranes. J. Chem. Phys. 17, no. 10: 856-60 (October, 1949).

The rate equations developed in Part I for the flow of solvent and solute through a permeable membrane have been extended to the case in which the flow is measured by the rise and fall in a capillary inserted into the more concentrated solution. The differential equation obtained for this case has been integrated to give an explicit relationship between the height of rise in the capillary and the time. The equation is shown to give the height-time relationship in the form found by experiment. It is shown that the osmotic pressure obtained with a semipermeable membrane is a special case of the more general theory of diffusion through membranes permeable to both solvent and solute. The possibility of positive and negative values of P, i.e., of initial rise or fall, respectively, in the capillary, is discussed, and the significance of these cases evaluated in terms of the molar volumes and permeation constants of solvent and solute. E.S.

SHULER, K. E., DAMES, C. A., and LAIDLER, K. J. The kinetics of membrane processes. III. The diffusion of various non-electrolytes through collodion membranes. J. Chem. Phys. 17, no. 10: 860-5 (October, 1949).

Measurements have been made of the rates of diffusion of various non-electrolytes, and of water, through a collodion membrane separating a dilute solution from pure water. The determinations were made by measuring the rate of rise and fall in a capillary tube in the solution, and analyzing the results using the procedure described in a previous paper. The work was done with 0.25 N solutions of sucrose, lactose, raffinose, and mannitol, and was carried out at different temperatures so that energies and entropies of activation could be determined. The energy of activation for diffusion through the membranes was found in all cases to be slightly less than for free diffusion, a result that is shown to be consistent with a positive heat of adsorption of the solute and solvent at the membrane. Analogously, the entropies of activation for membrane diffusion are somewhat less than for free diffusion, since the process of adsorption brings about a decrease in entropy. The rate of

diffusion of water through a membrane is shown to depend upon the nature of the solute diffusing, a result which arises from the fact that diffusion is a mutual process. An experiment is described in which there is an initial net flow from the solution into the solvent. 6 tables, 3 diagrams, and 10 references. E.S.

FIBER—STRUCTURE

WAKEHAM, HELMUT. The fine structure of cotton fibers from density measurements. Textile Research J. 19, no. 10: 595-605 (October, 1949).

Research on the apparent densities of cellulose fibers in different liquids gives information concerning the inner fiber structure which may be useful in characterizing certain desirable properties of cotton fibers. The following report describes an investigation of some factors involved in evaluating density data in terms of fiber structure. The interpretation is made of some experimentally determined densities of cotton and rayon fibers in benzene and in dioctyl phthalate—two liquids differing greatly in molecular dimensions—and in mercury, a nonwetting liquid. In the last case, the "over-all density" of a fiber, defined as the average density of all material within the outer wall of the fiber, is determined by a method utilizing a mercury-pressure volumenometer. In the case of the wetting liquids, higher densities were obtained with benzene—which has the smaller molecule; this indicates that the fibers have pore spaces which approach the dimensions of the molecule. When the cotton fibers are cut into short sections, about 1 mm. long, more of these pores and intrafiber channels are open to the liquid medium; therefore, a higher density is obtained for the cut fibers than for the whole fibers. Pore-space values within the fiber are calculated and compared with values obtained by other methods. The significance of these observations in the consideration of fiber structure is discussed. 6 tables, 7 figures, and 26 references. E.S.

FINANCE

ROBERTS, ARTHUR. Some facts about bank credit. Fibre Containers 34, no. 9: 70-1 (September, 1949).

Facts and directions are given which will help the small- and moderate-sized manufacturer, wholesaler, and retailer in the intelligent negotiation of a bank loan. E.S.

FLAX

TOBLER, FR. The lignification of bast fibers. Experientia 5, no. 10: 398-401 (October, 1949). [In German; English summary]

Lignification of the cell wall, which occurs in the bast fibers of flax and hemp to a lesser degree and in those of other plants to a greater degree, is a metabolic phenomenon dependent upon race, age, and external conditions. In general, it takes place in the oldest portions of the cell wall. Such lignification in the bast fibers does not necessarily parallel the formation of lignin in the stalk. A direct relationship exists between lignification of bast fibers and the ease of retting of the stalk, because this treatment presupposes pectic material in the wall. 2 diagrams and 18 references. I.H.I.

WILLIAMS, TREVOR I. Waste converted into valuable products: new uses for linseed straw. Indian Pulp and Paper 4, no. 1: 20, 24 (July, 1949).

Among the products which can be made from flax straw are building

board, insulating material, wrapping paper, and cardboard, a jute substitute, and a wax. R.R.

FOLDING BOXES

ANON. Bakery packaging. Modern Packaging 23, no. 2: 92-9, 200 (October, 1949).

Consideration is given to the appearance factors involved in bakery packaging, better board surfaces, high-gloss coatings for wraps, machinery trends, the requirements of bakery specialties, rolls, and sweet goods, bread wraps, and such new developments as hot-wrapped bread and pressure-sensitive waxed paper. Numerous illustrations are included. R.R.

ANON. Plan and result. Modern Packaging 23, no. 2: 102-6, 192, 194 (October, 1949).

A summary is given of the changes recently effected in the packaging of The Black & Decker Mfg. Co. to improve the physical strength of the packages, improve and standardize the labeling, emphasize brand identification, develop interchangeable packages, improve the identity and legibility of trade-marks, work out identifying color schemes, and reduce the number of different packages required. The two different trade names under which the company's products are marketed are identified by the package sleeves. The trays have double-glued side walls which provide high corner strength and resistance to crushing, are delivered flat, require no setup machinery, and provide neat unobstructed ends for labeling. The number of package sizes and shapes was reduced from 177 to 17. The program involves a 31.7% increase in box costs, but the company expects to offset this expense by savings in the purchasing and storing operations, the greater protection for the product, the intangible value of an adequate and appropriate packaging program, and a substantial saving in packaging labor. R.R.

ANON. Simple soles. Modern Packaging 23, no. 2: 128-30 (October, 1949).

The Shoe Products Division of the B. F. Goodrich Co., Akron, Ohio, has recently reduced a 55-package inventory to 18 containers. A new basic design and color scheme have been adopted so that all packages have similar identity, and names which formerly appeared as brands are now used to suggest only the type of heel. Only packages for top-selling items are ordered completely preprinted; others are imprinted with style, size, etc. on special equipment during packaging. Several cartons have been redesigned to make them stronger and to prevent merchandise from slipping out; all essential descriptive data concerning contents are concentrated on the end panels where they are easily readable when the packages are stacked. R.R.

DIXIE CUP COMPANY, *Easton, Pa.* Dixie woos the housewife. Modern Packaging 23, no. 2: 124-5 (October, 1949).

As a result of field tests, Dixie cups are now retailed for home use in packages containing a dispenser and two packages of the cups and in refill units. A simple opening and closing means is provided by a perforated line around three sides of one end of the package which can easily be opened by a thumbnail; the fourth side serves as a flap and permits the package to be reclosed. Sleeves are used to hold three and four individual cartons. Three sizes of cups are identified by different colors on the package. Combination packages, containing both dispenser and the cups, consist of a folding carton which is die-cut so that a large illustration of the holder can be folded into an upright position for display. R.R.

MANNING, C. F. Industrial uses of films and foils. Univ. Illinois Bull. Eng. Exp. Sta. Circ. Ser. No. 56: 71-5 (April, 1949).

Consideration is given to the use of foil alone and in combination as it is employed in the automotive and allied industries. One of the most interesting recent developments is a heat-sealing foil carton; when used with a liner, the protection is doubled. A new product known as a "flexcan" consists of a lamination of two sheets of foil wax-laminated to paper, with the foil on the outside; the package is almost hermetically sealed. R.R.

SLAUGHTER, J. E., JR., and MCMICHAEL, C. E. Plasticizing and packaging. J. Am. Oil Chemists' Soc. 26, no. 10: 623-8 (October, 1949).

The principal types of lard, compounds, vegetable shortenings, and margarine, and the processes and machinery for their solidification and plasticizing are reviewed. The different packaging procedures are considered in some detail. Ordinary lard is packed in cartons, 48-pound tubs or tins, and drums; all of these require refrigeration. The stabilized product is usually packed in one-, two-, four-, or eight-pound cartons. Top-quality shortenings are usually packed in one- or three-pound tins; all other consumer sizes disappeared during wartime. Glass and waxed cartons with a cellophane liner were used as substitutes when the tinplate shortage developed; the former presented a breakage problem and did not protect the contents from the harmful effects of sunlight, whereas the latter did not provide an airtight package and involved more hand labor. Consumer sizes of ordinary lard, stabilized lard, and nearly all of the compounds are packed in cartons with parchment liners. Automatic carton-forming and -closing machines are used and the filler is invariably of the high-pressure type. Some research work has been done to investigate the practicability of automatically printing and wrapping shortening; this would require major changes in chilling, plasticizing, and tempering techniques. Margarine is usually wrapped in vegetable parchment paper and cartons of heavy waxed stock. Two recent innovations deserve special attention; one is the plastic bag container with the coloring matter in a capsule affixed on the interior wall of the bag (*cf.* B.I.P.C. 18: 616-17) and the other is the introduction of the one-quarter pound print (*cf.* B.I.P.C. 20: 191). Automatic printing, wrapping, and cutting machines are available for this purpose. Several other innovations worth mentioning (although they are not yet widely employed) include the use of aluminum foil for butter wrapping in place of parchment paper and the introduction of the square die-cut carton with a window; the latter offers special merchandising advantages for packages with one-quarter pound prints. E.S.

FORESTS AND FORESTRY

ANON. Green gold. Unasylva 3, no. 5: 166-71 (September-October, 1949).

A description is given of a new documentary film on forests and timbers which has been produced for the United Nations by Svensk Filmindustri and is available through its Department of Public Information. The movie emphasizes the fact that all countries must work together to ensure forest perpetuation and use for the good of all. This is also the basic idea behind the formation of the Division of Forestry and Forest Products of the Food and Agriculture Organization of the United Nations. The work of the organization is summarized and the efforts of some member countries to promote better development of forest resources through the organization are outlined. R.R.

GAS TURBINES

BLOOMQUIST, W. C. Higher mill efficiencies and the gas turbine. Pulp & Paper 23, no. 11: 68, 70 (October, 1949).

To reduce fuel expense, which averages about 15% of the cost of the product, mills can recover waste heat, select higher pressures and temperatures for steam turbine generators, use topping and extraction steam turbines where applicable, select equipment properly, or purchase some of the power used, if that seems feasible. The author discusses gas turbines as one piece of equipment which offers a method of reducing the cost of steam and power. Although the steam turbine is a flow-type gas turbine, the term gas turbine usually refers to the combustion type. Examples are given of an installation for power and process steam in a paper mill, a gas turbine using exhaust heat for drying heavy paperboard, and a 5000 kw. gas-turbine power plant. Topping turbines can be used where additional power is required without a corresponding increase in process-steam requirements or where old low-pressure boilers must be replaced. The gas turbine has a definite place in a paper mill, but does not furnish a universal solution; each application should be thoroughly studied to determine whether a steam or gas turbine is the proper choice. 4 figures. R.R.

GLYCERIN

LESSER, MILTON A. Glycerine—the plasticizer. Southern Pulp Paper Manuf. 12, no. 10: 14, 16 (October, 1949).

Glycerin has been found the best general plasticizer for imparting softness, flexibility, and durability to paper and board. The most important applications are in the manufacture of glassine, vegetable parchment, and other types of greaseproof papers. Some other uses are for containers, laminants, towels and tissues, and wet- and dry-strength papers; several recipes are included. 18 references. E.S.

HISTORY

SMITH, JOHNSTON. Paper: origin, history and manufacture. Indian Pulp and Paper 4, no. 1: 51-2, 68 (July, 1949).

The author discusses the history of paper, the principal types now made, raw materials, and manufacture. R.R.

HUMIDITY

VAN WAZER, JOHN R. Humidity testing cabinet and improved humidity regulator. Anal. Chem. 21, no. 10: 1242-3 (October, 1949).

Close humidity regulation was achieved by letting steam into a cabinet through a solenoid valve controlled by a humidity-sensitive resistor. A description and wiring diagram for a sensitive relay activated by resistance variations are given. E.S.

INSECTS AND VERMIN

ST. REGIS PAPER COMPANY. Multiwall flour bag is pyrenone treated. Packaging Parade 17, no. 201: 63 (October, 1949).

A multiwall paper bag, the outer wall of which is treated with pyrenone, affords perfect protection against insect infestation and contamination of its contents. Under ordinary conditions flour can be shipped safely in un-

treated multiwall bags, but where severe shipping hazards are encountered, the treated bags are desirable. In a test shipment of flour in treated bags on which 4000 live red rust beetles were scattered, no beetles penetrated the pyrenone-treated sheet to reach the flour, 2361 were dead, and 287 were in a coma or paralyzed after 70 hours. R.R.

INSTRUMENTATION

BROWN, R. M. Instruments, some considerations in their use to the pulp and paper industry. Pulp Paper Mag. Can. 50, no. 10: 100-8 (September, 1949); *cf.* B.I.P.C. 19: 241.

The author discusses the application of instruments to sulfite and sulfate cooking liquors; various types of valves, with particular reference to the Saunders and butterfly valves; consistency control; the handling of chlorine; a continuous caustic soda dilution system; rotameters; an instrument air-supply system; panels and their lighting; etc. 18 diagrams. E.S.

MURPHY, E. A. Instrumentation in the sulfite acid plant. Paper Trade J. 129, no. 16: 41-4 (Oct. 20, 1949).

Because the preparation of sulfite cooking acid is a continuous process requiring extremely fine balance between its various stages for maximum efficiency, instrumentation results in many advantages. The author considers rotary and spray-type sulfur burners, gas coolers, and absorption towers and the use of instruments with such equipment. 8 figures. R.R.

INSULATION AND INSULATING MATERIALS

STEVENS, W. O. Power plant insulation prevents heat losses. Paper Ind. 31, no. 7: 828-30 (October, 1949).

Following a brief description of the modernized Woodfibre, B. C., power plant of the British Columbia Pulp & Paper Co. (*cf.* B.I.P.C. 18: 328), the insulating materials and procedures used in its construction are described. The basic insulating material is magnesium carbonate with asbestos fibers added for binding and reinforcing qualities; where temperatures exceed 600° F., an inner layer of a high-temperature insulation is used in combination with 85% magnesia. Tabulated data on the thickness of the insulating materials on piping and other equipment are included. 3 illustrations. E.S.

INTERIOR PACKING

PRESTON, E. W. Industrial cushioning materials. Univ. Illinois Bull. Eng. Exp. Sta. Circ. Ser. No. 56: 76-80 (April, 1949).

The author does not recommend single-faced corrugated as a cushioning material although it is a good bulk material and useful for shock absorbing. On one packaging problem involving a delicate instrument, only a packing of shredded parchment within a mastic container offered sufficient protection. The quality of the cushion must be carefully determined for certain products; the surfaces of fine furniture, for example, may require a cover of waxed paper before the cushioning material is put on. If a loss occurs because of the failure of a cushion, that loss, which may include the original cost of the item and packaging materials, transportation two ways, repacking, and reshipping, must be charged to packaging. Because of this, only materials which are known to be adequate should be used; money is saved by the damage which is avoided. Where a variety of items is packed, there must be a variety of internal cushioning materials available. R.R.

JUTE

SEN, M. K., and HERMANS, P. H. Origin of hygroscopicity of jute. Nature 164, no. 4171: 628-9 (Oct. 8, 1949).

It appears that the greater hygroscopicity of jute in comparison with cotton is almost entirely caused by a greater quantity of amorphous constituents in polyuronides, xylan, hexosan, and lignin in the fiber. The inappreciable change in the swelling behavior of jute on delignification up to 0.5% lignin indicates that the major part of lignin is inactive as far as moisture absorption is concerned. 7 references. R.R.

KRAFT PULP AND PAPER

EVERY, DERNELL. The outlook for kraft wrapping papers. Paper Sales 9, no. 10: 13-14 (October, 1949); Am. Paper Converter 23, no. 10: 14, 30 (October, 1949); Am. Paper Merchant 46, no. 11: 22-3 (November, 1949).

Before the war at least 30% of the kraft paper manufactured was used as wrapping paper; today no more than 20% is so utilized. The increasing use of bags and boxes for quick wrapping and prepackaging is responsible for the decline and will continue to keep the wrapping-paper industry from expanding in proportion to national income or population. In 1948 wrapping-paper shipments surpassed 6000 tons per week; in the first quarter of 1949 the figure reached an approximate 7500 tons weekly. Thereafter, with a drop in consumer spending in excess of the 3% decline in income, wrapping-paper orders declined to 5000-6000 tons a week. The drop was later but more severe than that suffered by most other divisions of the pulp and paper industry. The wrapping-paper industry, operating at about 67% of its capacity during the second quarter of this year, is now surpassing 80% of capacity. The author predicts increases to 8000 tons per week for the rest of 1949 and into the first quarter of 1950. Prices for kraft wrapping paper have approximately followed volume. Current prices are below those prevailing during the first quarter of the year and seem in balance with commodity prices generally and the manufacturers' costs in relation to their business volume. At the present time it seems that the inventory adjustment was overdone; orders for kraft paper have increased and can no longer be filled in 10-14 days. It is probable that kraft wrappings and most other coarse papers and products may be in short supply well into 1950. R.R.

LIGNIN

AGGARWALA, JAGDISH C. Nature of bamboo lignin. Indian Pulp and Paper 4, no. 1: 12-14, 17 (July, 1949).

Following a brief summary of the research on lignin structure, consideration is given to the studies made on the structure of bamboo lignin. The results of the author's work are discussed and data are tabulated on two digestions of the wood, one involving a slightly weaker cooking liquor, a lower temperature, and a longer cooking time than the other. If all methoxyl is attached to lignin in bamboo, the results of this work suggest that there are two types of lignin present, one a very resistant type with a high percentage of methoxyl and the other a type readily degraded into low molecular-weight fragments and with a low methoxyl content which may be lost if digestion is severe. The dialysis of the sulfite waste liquors produces purified lignin compounds with a low methoxyl content—9.8 to 11.2% on a sulfur-free basis. The low figure can be accounted for by the assumption that three lignin structural units are present in bamboo, a syringyl, a guaiacyl, and a hydroxyphenyl unit. Barium salt fractions of purified bamboo lignin sulfonic acids were found to have molecular weights

ranging from 7000 to 90,000. A study of ultraviolet absorption spectra of lignin compounds showed that the absorption at a given wavelength decreases with decreasing molecular weight. In the region of 2700 A the curve becomes flat. 11 references. R.R.

DAY, WILLIAM C., PELCZAR, MICHAEL J., JR., and GOTTLIEB, SIDNEY. The biological degradation of lignin. I. Utilization of lignin by fungi. Arch. Biochem. 23, no. 3: 360-9 (October, 1949).

Thirty-five cultures of white rot fungi were screened for their ability to utilize native lignin. Under the experimental conditions described, many of these cultures exhibited growth response when lignin was the limiting source of carbon in the medium. However, the results from these screening experiments could not be clearly evaluated because of variations in growth on duplicate determinations and other irregularities in growth response. As a consequence, six of the cultures were selected and an attempt made to adapt them to lignin utilization by growing the cultures for a prolonged period in a lignin-glucose medium, gradually diminishing the glucose content until it reached zero. By this approach, it was possible to obtain two cultures, No. 13, *Polyporus abietinus,* and No. 14, *Poria subacida,* which consistently produced an appreciable amount of growth on a solid or liquid medium in which lignin was the limiting source of carbon. Both of these media were of chemically defined composition except for the agar in the solid medium. The availability of such a technique for rapid growth of fungi on a synthetic medium containing lignin provides for a more rigorous and rational approach to the mechanism of biological degradation of lignin than has been hitherto possible. 9 references. E.S.

GOTTLIEB, SIDNEY, and GELLER, JERRY H. Enzymatic decomposition of lignin. Science 110, no. 2851: 189-90 (Aug. 19, 1949).

The decomposition of isolated native red spruce lignin (I) by means of enzymes was studied. A number of wood-rotting fungi were tested, of which several show good growth after two weeks' incubation on media containing lignin as the sole carbon source. An enzyme (II) was isolated from the spawn of *Agaricus campestris* in 0.5% yield. (II) is quite stable in solution at pH 4.0-6.5 but loses its activity rapidly at a higher pH. (II) does not seem to be identical with any of the known phenol oxidases. In a solution buffered with citrate and phosphate to pH 6.0 and containing 3 mg. of (II) and 30 mg. of (I) per cc., 75 cu. mm. of oxygen are absorbed within one hour. Details of the investigation will be published elsewhere. 15 references. F.E.B.

JENSEN, WALDEMAR. The determination of lignin. Finnish Paper Timber J. 31, no. 9: 143-6 (May 15, 1949). [In English]

A study of the lignin determination in pine (*Pinus sylvestris*) (I), spruce (*Picea excelsa*) (II), and birch (*Betula verrucosa*) (III) with sulfuric acid shows that for (I) a 72%, for (II) a 74%, and for (III) a 71% acid gives the lowest lignin yield (26.1%, 25.3%, and 17.6%, respectively) with the highest methoxyl content (15.8%, 17.2%, and 21.0% respectively). This method is compared with the Halse method which, with (III), gives 19.6% lignin with 21.0% methoxyl. The pine samples should be pre-extracted with acetone, and the spruce and birch samples with ether. 8 references. F.E.B.

KLEINERT, TH. Formaldehyde, a reaction product of the lime-alkaline scission of lignosulfonic acid. Monatsh. 80, no. 4: 582-4 (August, 1949). [In German] *cf.* B.I.P.C. 19: 776.

When sulfite waste liquor is heated for three hours with an excess of lime

at 150°C., about 70% of the organic matter is precipitated and 80% of the organically combined sulfur is split off. Keeping the moist (50% water content) precipitate for several days in a closed bottle in the presence of air causes the formation of formaldehyde. The same is observed with a calcium lignosulfonate prepared by means of the quinoline salt. No appreciable amount of acetaldehyde or vanillin can be detected. The latter is formed, however, when the dried precipitate is exposed to the action of the air. 7 footnotes. F.E.B.

KRATZL, K. The bromination of lignosulfonic acid and its model substances. Monatsh. 80, no. 3: 437-8 (June, 1949). [In German] *cf.* B.I.P.C. 19: 776-7.

The di- and tribromoacetaldehyde and the dibromoacetaldehyde diethylacetal formerly found on bromination of lignosulfonic acid and its model substances have been found to result from the reaction of the bromine with a small amount of ether present during the bromination. With the complete exclusion of ether, no brominated acetaldehyde derivatives are found. The other results of the bromination experiments are not affected by this finding. 5 footnotes. F.E.B.

SANDERMANN, WILHELM. The reaction of lignin and wood with dicarboxylic anhydrides. Svensk Papperstidn. 52, no. 15: 365-70 (Aug. 15, 1949). [In German; English and Swedish summaries]

Attempts have been made to condense hydrotropic poplar lignin (I), a technical kraft pine lignin (II), and a Scholler lignin (III) with maleic (IV) and succinic anhydrides (V) by heating the lignin with an excess of (IV) or (V). It was hoped that the tertiary hydroxyl group could be split off as water, thus forming a reactive double bond which could react with (IV). Unlike (II) and (III), (I) gave a water-soluble product, indicating the introduction of hydrophilic groups into the lignin molecule. Poplarwood, treated with (IV) in a similar way followed by saponification with 5% sodium hydroxide, gave a pulp with less than 1% residual lignin. Under the same conditions (V) did not delignify the wood. No analyses of the lignin compounds are given. 23 references. F.E.B.

MACHINERY

ANON. Waldron machines improve coating processes. Paper Trade J. 129, no. 14: 43 (Oct. 6, 1949).

Illustrated descriptions are given of the Microjet laboratory coater, designed for the laboratory testing of coating formulations suitable for the new air blade method of coating; the Diatron coater for use with lacquers with a high solids content, metallics, vinyls, pigmented oils, etc.; the Aut-O-Lac sheet-varnishing machine, which handles all popular sizes of sheets; the Hydrowind constant tension winder; and the Davidson-Pomper pick tester (not illustrated), which is applicable to any kind of coating. R.R.

GUNDERSEN, FRITS-HARALD. Technical developments in the paper industry. Norsk Skogind. 3, no. 7: 173-80 (July, 1949). [In Norwegian] *cf.* B.I.P.C. 19: 20.

Supplemented by diagrams and illustrations, the following recent technical developments are discussed briefly: the application of BSM-11 (a phenylmercuric acetate by Buckman Laboratories) as a slimicide; the coating of iron and steel surfaces with Neoprene, Nitrocote, and Durofilm for im-

proving their corrosion resistance; a new pulp disintegrator by Leije & Thurne; improvements in the dewatering of high-speed paper machines, including the Dixon-Walmsley suction device, the Broughton vacuum controller, and the Sulzer small-capacity Turbo blowers; a new Broughton oscillating shower; a Vickery felt conditioner with jordan-type conditioner box; a device for the continuous removal of the drier condensate; a new Foxboro continuous surface pyrometer; a moisture regulator of the traveling paper web by Schie and Stråtveit; a Stamm moisture control system in the drier section; special features of a new book paper machine built by Rice Barton; a new winder by Goebel (Darmstadt); a new welding apparatus for wire repairs by C. H. Johnson & Son; and a fully automatic winder and slitter designed by G. Roen and built by H. Th. Refsum in Drammen. E.S.

THE PUSEY & JONES CORPORATION. Puseyjones paper making machines. Paper Trade J. 129, no. 12: 103-4 (Sept. 22, 1949); *cf.* B.I.P.C. 19: 249; 20: 114.

Following a brief description of certain design improvements, such as the Puseyjones flow spreader, Rapi-Drape method of wire handling, and the Stream Flow vat system and cylinder mold, new installations since August, 1948, are listed. In conclusion, reference is made to the Simplex press arrangement. E.S.

MACHINERY—BEARINGS

SPENCER, GEORGE H. Suggested standardization of spherical roller bearings for wet and drier sections of paper machines. Tappi 32, no. 10: 433-9 (October, 1949).

Brief reference is made to the basic types of roller bearings available for paper machine applications, followed by descriptive characteristics of the spherical roller bearing. Some bearing-mounting details are mentioned and reference is made to the theory of predicted bearing life. Paper machines, both Fourdrinier and cylinder, are grouped together and suggested standardization in tabular form of spherical roller bearings is given for machine widths of 100 to 139 inches, 140 to 179 inches, and 180 to 240 inches at speed groupings up to 800 ft./min., 800 to 1500 ft./min., and 1500 to 2000 ft./min. Basic data for bearing computations are given. Bearing-size selection has been made based on 15 years' average life. The new AFBMA (Anti-Friction Bearing Manufacturers Association) bearing numbers are shown. Subject matter pertaining to the specific application of various types of bearing mountings for the front side of paper and/or felt driers is discussed. Details and illustrations pertaining to the ladder-type method of providing for axial expansion are presented. 5 tables, 6 figures, and 6 references. E.S.

MACHINERY—CONVERTING MACHINERY

ANON. Stone's modernization program. Fibre Containers 34, no. 9: 48, 50 (September, 1949).

Brief reference is made to new installations at the Stone Container Corp. plant at Chicago, Ill., including a new 95-inch corrugator which is expected to operate at 400-500 ft./min., and an aniline-rotogravure press. 3 illustrations. E.S.

DENNE, A. G. Stitching wire and machines. Univ. Illinois Bull. Eng. Exp. Sta. Circ. Ser. No. 56: 221-6 (April, 1949).

All stitching machines form stitches from a continuous-length coil of wire (which is usually steel with a coppered or galvanized finish), drive them through the board, and clinch them in one operation. The main variation between models is in the unit which supports the clincher. The three most common types, e.g., post, straight-arm, and thin-blade types, and the wire utilized are briefly described. The uses of each type of machine, their maintenance, the characteristics of a good stitch, and the regulations covering this closure method are reviewed. R.R.

FARRELLY, WALTER. Getting the most out of machinery for films. Am. Paper Converter 23, no. 9: 20-1; no. 10: 12-13 (September, October, 1949).

Optimum storage conditions for most films include a temperature of 60-70° F., 40-50% R.H., and protection from strong sunlight. Various suggestions are given regarding the machinery on which films are used, including the maintenance of proper tension; the replacement of worn rolls; the use of corrugating devices, air jets, and static eliminators to facilitate feeding; and the need for sharp, properly adjusted knives, correct adjustment of side plates and folding parts, and thorough cleaning of machine parts which touch the film before using a film of another type. The importance of the proper temperature for the various types of heat-sealing films is stressed; recommendations should be secured from the manufacturer of the film. Sticking and excessive dragging of heat-sealing coated and plastic films can be minimized by coating the sealing plates. Bag closure by means of adhesive tape, wire staples, and heat-sealing is considered. R.R.

STEINBAUER. Recent developments in bag-making machinery. Allg. Papier-Rundschau no. 10: 494-5 (Sept. 15, 1949). [In German]

Several constructions are described and illustrated. E.S.

MACHINERY—DIRTEC

REYNOLDS, VANCE L. Separation of dirt from unbleached pulp by centrifugal type classifiers. Tappi 32, no. 10: 454-7 (October, 1949).

The possibilities of removing dirt from unbleached sulfite pulp by use of the Dirtec (Bird Machine Co.) and the Vortrap (Nichols-Freeman) were investigated. Both were found to remove dirt in the order of 30% of the specks and 10% of the shives. Experimentation indicated that a high-positive bleed is necessary, and that the sumps as settling chambers are ineffectual with unbleached stock. An installation of these classifiers can be so arranged that losses of acceptable fiber are held to a minimum. There is no apparent change in unit efficiency when the capacity is increased by enlarging the inlet nozzle. Although the purpose of this study was not a critical comparison of the Vortrap with the Dirtec, the results of tests made with both of them indicate that they are about equal in dirt-removing ability. 4 figures and 4 references. E.S.

MACHINERY—KOLLERGANGS

BALTZ, W. E. Contribution to improvements in the construction of kollergangs. Das Papier 3, no. 15/16: 310-13 (August, 1949). [In German]

A mathematical and engineering study indicates that modification in the construction of kollergangs could be made so as to attain any desired working pressure with a marked saving in weight of the runner stones. The computations and conclusions should stimulate further studies by machine manufacturers. L.E.W.

MACHINERY—PACKAGING MACHINERY

RAPPAPORT, S. Basic mechanisms of packaging machinery. Modern Packaging 23, no. 2: 133-7 (October, 1949).

All mechanisms employed in the building of an automatic machine must be structurally sound, involve no mechanically indeterminate conditions as to displacement and velocity, be reversible, and be theoretically correct. Mechanisms are described and illustrated for intermittent and variable motions, such as the Geneva-wheel types, rack and cam drive, the ratchet wheel and ratchet and cam drive, and the three-gear drive, and for straight line motions, the astroid gearing, the hypocycloid parallel motion mechanism, the drive frame, and the two-teeth gear. R.R.

MACHINERY—PASTING MACHINE

THE UNION TOOL CORPORATION, *Warsaw, Ind.* New cleat gluing machine. Fibre Containers 34, no. 9: 85-6 (September, 1949).

An illustrated description of a new machine is given, which glues cleats to corrugated board in the production of wood-cleated fiber boxes. It consists of a conveyor table, glue spreader rolls, and pressure rolls. E.S.

MACHINERY—PRINTING MACHINE

ANON. German printing machines of the postwar period. Allg. Papier-Rundschau no. 10: 487-93 (Sept. 15, 1949). [In German]

An illustrated description of different new postwar constructions is given. E.S.

CHAMPLAIN COMPANY, INC., *Bloomfield, N.J.* Rotary aniline-anilox press for folding cartons. Fibre Containers 34, no. 9: 98-100 (September, 1949); *cf.* B.I.P.C. 19: 94.

A rotary aniline-anilox press using rubber plates was introduced at the AMA Packaging Exposition in May, 1949, at Atlantic City. The press is designed for printing on board, cellophane, foil, and glassine, and is especially suitable for folding cartons where high speed is an essential factor in production. It can be used for long or short runs and combined with other rotary equipment, including Champlain rotogravure or letterpress units. The working parts and capabilities of the press are described. 4 illustrations. E.S.

PEARCE, LEWIS C. New machine for tag printing and fabrication. Am. Paper Converter 23, no. 10: 16, 18 (October, 1949).

An illustrated description is given of the new Pearce Multi-Converter for printing and fabricating labels, tags, tickets, checks, etc. in one fast, continuous operation. It incorporates flat-bed presses and any number of operational stations through which the web moves with rapid intermittent action. Printing is done from metal types, electros, or rubber plates on one or both sides of the web and in one or more colors. R.R.

MACHINERY—PULPERS

SERGEANT, S. V. Modern methods of pulping. Indian Pulp and Paper 4, no. 1: 31-3 (July, 1949).

Illustrated descriptions are given of the Sturtevant bale pulper, Dilts Hydrapulper, Stapley pulper, and Liebeck fibrator. R.R.

MACHINERY—REFINERS

ANON. Sprout-Waldron refiners at Maizewood. Paper Trade J. 129, no. 12: 104-5 (Sept. 22, 1949).

A brief description of the principle of operation and field of application of disk refiners is given; depending on the pH range encountered, standard, semi-acid, or fully acid-resistant constructions are used. The Maizewood installation includes three 400-h.p. units of standard construction. E.S.

VOĬTSEKHOVSKIĬ, R. V. Operating characteristics of conical refiners. Bumazh. Prom. 24, no. 4: 19-21 (July-August, 1949). [In Russian]

A mathematical treatment is given to the performance characteristics of conical refiners; formulas are included for calculating cutting length per second, a numerical coefficient (ratio of the cutting length to refining capacity), refining capacity, area of contact between knives, and power expended in refining. E.G.S.

MACHINERY—SHOWERS

NUKI, R. P. A new spray pipe. Paper-Maker (London) 118, no. 3: 173-8 (September, 1949).

The author describes "efficiency" spray pipes of the nonoscillating type, utilizing disks which give a flat, triangular, fan-shaped spray and with which water savings up to 80% are claimed to be possible. White water can be employed if certain precautions are observed. The velocity in the pipes should never fall below a minimum (about 9 ft./sec.); the shortest circuit between the white water and its place of application must be used, avoiding a large number of bends in the supply line; the white water for spraying purposes must be screened and should never drop suddenly from any height; and a rotary movement must be given to the water which has a scouring effect on the walls of the conveying piping and spray pipe, so that formation of deposits is prevented. The spray disks and pipes are made of a hard, corrosion-resistant material, such as copper, bronze, Monel, or stainless steel; if a combination of metals is used, care has to be taken to avoid the possibility of electrolytic corrosion. The pipes should be shockproof, smooth, and rigid. Since there are no moving parts, maintenance cost is low. Various applications on Fourdrinier and cylinder machines are described, including the cleaning of wires, wire rolls, screens, cylinder molds, froth killing on headboxes, sand traps, etc. 2 tables and 11 diagrams. E.S.

MATERIALS HANDLING

ACKERMANN, J. A. Rotary-clamp truck speeds handling of heavy rolls. Paper Trade J. 129, no. 16: 46-7 (Oct. 20, 1949).

An illustrated description is given of the Elwell-Parker rotary-clamp truck. The body, power equipment, and elevating and tilting mechanisms are similar to those of the modern fork units. The rotating apparatus resembles that on

the nontiering roll handlers which are equipped with a semicylindrical steel cradle or scoop. The adjustable clamp and its controls are a rather recent development. The clamp is attached to the rotator; the two units are virtually one unit when assembled. The clamp grips rolls securely without marring them to permit fast work on the straightaway and in high tiering. The new truck is not intended to supersede the older types. Performance data are given. R.R.

FOSTER, S. L. Conveyors for materials in a pulp and paper mill. Tappi 32, no. 10: 449-53 (October, 1949).

The materials-handling facilities of The Kalamazoo Vegetable Parchment Co. Ltd. plant at Espanola, Ont., are described. Starting with the woods operations, the equipment needed for transporting the pulpwood to the mill and subsequent processing is given. Consideration is also given to the handling of chemicals and other mill supplies used by this mill. 10 illustrations. E.S.

ILLINOIS. UNIVERSITY. Papers presented at the first short course on industrial packaging and materials handling. Univ. Illinois Bull. Eng. Exp. Sta. Circ. Ser. No. 56: 248 p. (April, 1949).

In addition to the papers abstracted and listed under their particular subjects, the following are of interest to the industry: Farney, R. E. What is a packaging engineer, and what are his tools? p. 11-17; Sell, R. C. The relationship between packaging, materials handling, and transportation, p. 18-22; Pigage, L. C. How to make a survey, p. 23-4; Converse, Paul D. Effective use of market research, p. 25-7; Laitala, Everett. Plant layout from a materials handling standpoint, p. 30-5; Pigage, L. C. Work simplification, p. 36-9; Swanson, C. E. Applying modern materials handling methods to railroad stores operation, p. 40-5; Winslow, Seth L. The principles of materials handling and the materials handling engineer, p. 46-51; Roehrig, W. H. Mechanical handling of materials on docks and platforms, p. 92-7; and Cahners, Norman L. Application of materials handling to small business, p. 98-102. R.R.

MATERIALS OF CONSTRUCTION

INDUSTRIAL AND ENGINEERING CHEMISTRY. Chemical engineering materials of construction. Ind. Eng. Chem. 41, no. 10: 2091-154 (October, 1949); *cf.* B.I.P.C. 19: 171-2.

The third annual review is similar in scope to that of the previous year and includes the following articles, listed by authors and titles: Verink, E. D., Jr., and Brown, R. H. Aluminum alloys—38 references, p. 2095-7; Ford, C. E. Carbon and graphite—34 references, p. 2097-9; Payne, C. R. Cements—67 references, p. 2100-2; Koenig, John H. Ceramics—41 references, p. 2102-8; Bulow, C. L. Wrought copper and copper-base alloys—117 references, p. 2108-14; Fisher, Harry L. Elastomers—93 references, p. 2115-19; Casey, Robert S., and Grove, C. S., Jr. Fibers—107 references, p. 2119-21; Larrabee, C. P., and Snyder, S. C. Iron, mild steels, and low alloy steels—27 references, p. 2122-4; Hiers, G. O. Lead and its alloys—25 references, p. 2124-5; Friend, W. Z. Nickel and high-nickel alloys—240 references, p. 2126-32; Kline, G. M. Plastics—109 references, p. 2132-7; Peters, Henry. Hard rubber—44 references, p. 2138-9; Brown, M. H., and DeLong, W. B. Stainless steels and other ferrous alloys—194 references, p. 2139-46; Gonser, Bruce W. Tin and its alloys—44 references, p. 2147-9; Stamm, Alfred J. Wood—60 references, p. 2149-52; Uhlig, H. H., and Broughton, D. B. Less common metals—67 references, p. 2153-4. E.S.

MILKWEED

BERKMAN, BORIS. Milkweed—a war strategic material and a potential industrial crop for sub-marginal lands in the United States. Econ. Botany 3, no. 3: 223-39 (July-September, 1949).

The author discusses the possibilities of the industrial utilization of the milkweed plant and the problems involved in the mechanization of planting, cultivating, and harvesting the crop. The plants must be produced as an agricultural crop and not collected from wild-growing material. The rubber obtainable from the latex is only of minor value; the principal products are the floss and the fiber. 47 references. E.S.

MILL CONTROL

GAVELIN, GUNNAR. The planning of a laboratory for a paper mill. Indian Pulp and Paper 4, no. 1: 15-17 (July, 1949).

As an aid in planning expenditures for paper-mill laboratories, the author considers the value of the work done in the control of paper quality, production, and raw materials and the value of development and research activities. In conclusion, the location and personnel of a laboratory are discussed. R.R.

MILL MANAGEMENT

HERON, ALEXANDER R. Management's job is selling. Tappi 32, no. 10: 22A, 24A, 28A, 30A (October, 1949).

The author considers "the management system" as an institutional force in American life and discusses the part which it must play in the total combination of forces which make up the American economy. Management's most important job today is selling to customers who have freedom of choice (selling connotes quality, price, service, and research), thereby creating the jobs which the workers must have. The American idea of selling is inseparable from competition on the one side, and freedom of choice on the other. E.S.

IRWIN, HERBERT F. Training supervisors in administration of collective bargaining agreements. Pulp Paper Mag. Can. 50, no. 10: 140, 142, 144-6, 148, 150, 152; no. 11: 140, 142-4, 146, 148 (September, October, 1949).

Every executive and supervisory employee must have a thorough knowledge and understanding of the provisions of a collective bargaining agreement and be ably instructed and guided in the day-to-day administration of the agreement. The need for organized training of foremen and supervisory employees is demonstrated every day, as illustrated by typical examples. Based on the replies to a questionnaire sent to firms in Canada and the United States, the author discusses the questions and answers given by industry with regard to the specific training in the administration of collective-bargaining agreements in operation in various plants. A list of 46 test questions for foremen is appended. E.S.

MOLDS

ARMITAGE, F. D. The cause of mildew on books and methods of prevention. Patra Bulletin no. 8. Leatherhead, Printing, Packaging and Allied Trades Research Association, 1949. 14 p. + 4 plates [Confidential to members of PATRA] World's Paper Trade

Rev. 132, no. 13: 866 (Sept. 29, 1949); Paper Market: 76A (September, 1949); Brit. Printer 62, no. 369: 30-2 (November-December, 1949).

At the request of bookbinding members and The Publishers Association, PATRA has been investigating methods of treating bookbinding materials, so that bound books will not readily become damaged by insects or from infection by mildew. Letters from abroad, particularly India and South America, indicate that British-bound books do not withstand insects and mildew as satisfactorily as books which have been bound in other countries. The author discusses the origin of mildew whose spores, given a moist and warm atmosphere, find fertile ground for growth on printing papers, end papers, dust covers, chipboard, millboard, strawboard, mull or calico, sewing thread, many of the finishes of bookcloth, leather, and most adhesives, nearly all the materials used in the production of bound books. Given these materials, untidiness, a R.H. above 70%, and a warm temperature above 65° F. (although this is not essential for all molds), mildew will form on bound books in store. Mold infection can be held to a minimum by strict cleanliness in all operations and all departments, avoiding damp spots, keeping the air as dry as possible and constantly moving, and the temperature down to or below 65° F. The bound books should be thoroughly dried before packing for shipment. Books slightly damaged by mildew may be cleaned with a clean linen pad carrying cedarwood or clove oil or saddle soap for leather bindings; all remedies should be tried out on a small section of the book first. If moldy books are stripped for rebinding, all infected materials and their wrappings must be burned. No one substance has yet been discovered which will prevent mold from growing on books; each material must be treated with its own type of inhibitor. Molds do not readily grow on the newer synthetically filled bookcloths or on synthetic emulsion adhesives. E.S.

MOLECULAR WEIGHT

AGGARWALA, JAGDISH C., and MCCARTHY, JOSEPH L. Distribution of molecular weight in bamboo celluloses. J. Indian Chem. Soc. 26, no. 1: 11-18 (1949).

Bamboo wood and celluloses isolated from it were nitrated and fractionated by solution or precipitation methods. The D.P.'s of the fractions were determined viscometrically, using a Cannon-Fenske type viscometer. The average D.P. for the cellulose in the wood was 1620, and those of the isolated celluloses 1350, 775, and 1260, respectively. The distribution in molecular weight of the cellulose in bamboo wood was found to differ from that of gymnosperms, such as hemlock and spruce. Celluloses isolated from a mixture of bamboo species show complex molecular-weight distribution curves. 5 tables and 2 figures. E.S.

PAPER—COATED

ANON. What's new in vinyl spread coating? Modern Plastics 27, no. 2: 82-5, 162, 164, 166 (October, 1949).

Of the three methods of spread coating vinyls, e.g., dip, knife, and roll, dip coating is the simplest. The apparatus consists of a lead-in roll, an immersion roll, and a pan containing the coating material; it is inexpensive to build, but expensive to operate because the coating must have a low solids content to flow freely. The coating produced is not uniform because it is subject to the varying porosity and thickness of the web and the varying viscosity of the coating. It is an excellent method for coating on paper. The most commonly used coating head is the floating knife coater, with which the coating material is applied on the face of the web in front of the

knife; dams keep the material from spreading laterally. Because the knife is supported only by the web, the coater cannot handle low-strength materials. Another disadvantage is that the web tension is difficult to control. The Microjet air-knife coater can handle a wide range of viscosities and its simplicity of operation results in low operating costs and permits the use of inexperienced operating personnel. The production rate is limited only by the speed of the machine itself and by the drying rate. The numerous types of roll coaters are used chiefly for paper. Basically, the machine consists of a series of steel and rubber-coated rollers so integrated that one of them revolves in a pan of coating material while the others pick up the material from the pan roller and distribute it evenly on the web by means of roller pressure. The reverse roll coater is the most flexible type. In tower coating all equipment is set in a vertical position. By this method either paper or cloth can be coated with a roll, reverse roll, knife, or dip coater; it has been used for years for simultaneously coating both sides of a fabric. Multiple setups are possible and multiple coatings can be applied in one pass through the machine. The speed is usually slow. The recently developed edgewise coater is designed to work similarly to a tower coater, but the rolls are placed vertically rather than horizontally; the speed is greater. The new Waldron Diatron Coater utilizes a rubber diaphragm controlled by air pressure to obtain the correct coating thickness between the web and the floating blade. It is especially useful for samples, short runs, and different colors or types of coatings on closely woven fabrics. Illustrations are included of some of the equipment described. R.R.

PAPER—MERCHANDISING

DUNNAGEN, CARL E. How the paper merchant can aid the printer. Paper Sales 9, no. 10: 19-20 (October, 1949); Am. Paper Merchant 46, no. 11: 20-1, 26 (November, 1949).

The paper merchant should have a thorough knowledge of the basic types of printing paper, the uses to which they are best adapted, the printing processes, techniques, other printing materials, and the conditions under which printing is done in order to consult intelligently with the printer on the best paper for a given job. The merchant should know where to get paper for all regular and special jobs and should inform the printer of the good or bad characteristics of certain papers and new developments in papers. He should do an honest sampling job, co-operate with mills in disseminating information and ideas which will lead to new markets, conduct merchandising programs of his own to expand the printing market, and stock enough varieties and grades of printing papers to meet all normal needs. Every paper shipment delivered to the printer should be accompanied by an out-turn mill sample of the shipment so that it is not necessary to open a skid for inspection upon arrival. When paper is sold directly to publishers for consignment to the printer, it should be identified as to publisher by a label, stencil, etc. for the printer's convenience. The skid number should be on the skid itself; the number is difficult or impossible to trace if paper handlers forget to transfer it when the wrapper is removed. For printers who buy paper in roll form, which is sold by weight rather than linear measure, there should be some way of guaranteeing the printer the mileage he needs for a job, particularly if a special weight or grade is secured from the mill. R.R.

PAPER AND PULP INDUSTRY

ANON. Wood pulp: conclusions of the Montreal Conference. Unasylva 3, no. 5: 172-8 (September-October, 1949); Paper Trade J. 129, no. 18: 23-7 (Nov. 3, 1949).

Because physical limitations and the economic and financial problems con-

nected with the acquisition of desirable supplies seem to interfere with the satisfaction of consumer needs, the Montreal Conference considered only the present and future effective demand of the pulp-using industries. If the estimates are confirmed by future developments, there should be no major wood-pulp surplus or deficit during 1948-1955. Although the almost 28 million metric tons of pulp produced in 1948 is the highest on record, there is an estimated unused pulp producing capacity of 4.3 million tons in Europe and over a million tons elsewhere, chiefly in Japan; in addition, a large new capacity is under construction or is being planned. World production (excluding U.S.S.R.) was almost 4 million tons higher in 1948 than in 1937, the best prewar year, and was slightly in excess of current consumption. The estimates for 1949 and 1950 indicate a rapid restoration of equilibrium. Production and consumption figures are tabulated for the various continents for 1937 and 1948 and estimated data are tabulated for 1949, 1950, and 1955. The prospective situation in 1955 is considered with respect to consumer needs, production and requirements, and raw materials. The situation in Europe, U.S.S.R., North America, the Near East, Africa, Latin America, Asia and the Far East, and Oceania is summarized. In conclusion the world trade in wood pulp is analyzed. 3 tables. R.R.

ARIES, ROBERT S., and COPULSKY, WILLIAM. The market for bleached sulfate pulp. Paper Trade J. 129, no. 17: 37-9 (Oct. 27, 1949).

The greatest problem which had to be overcome in the production of bleached sulfate pulp was the retention of pulp strength in bleaching. With the commercial use of chlorination and caustic extraction stages, the demand for kraft pulp rose above other bleached types. The sulfate process can reduce almost any wood to pulp with greater rapidity and higher yield, and will result in a stronger product than is possible with the sulfite or soda process. Bleached sulfate pulps are used alone for papers for bags, food containers, charts, maps, envelopes, tags, bonds, waxing, onion skin, writings, covers, offset, parchment, and other specialties. In blends they are used with groundwood, sulfites, and soda pulps. The northern pulp made from spruce is preferred to the southern product which has coarser fibers and often contains some short-fibered hardwood pulps. Almost all the domestic supply is from the South; the northern pulp is virtually all imported from Canada and Scandinavia. Only about 6% of the U. S. production is market pulp, and the figure tends to decrease slightly with time. Only about five North American producers regularly have bleached kraft pulp for sale. About 12 new mills have been proposed for North America in the next few years, but most of them will not produce market pulp. The Nanaimo Sulphate Pulp, Ltd. mill on Vancouver Island is expected to produce 200 tons/day, chiefly for export to the United States as market pulp, and the proposed Alberta Pulp Mills, Ltd. mill will produce a small amount for the market. The lack of modern equipment and fuel shortages are expected to hold down European production for some years; when production is greater, much will be needed for local use. Bleached sulfate production and consumption are increasing more quickly than those of other types. New uses have been found in frozen food, meat, and bread wraps, protective linings, twisting and spinning papers, and toweling. The principal use is in book, fine, and wrapping papers and folding boxboard. The future demand will probably continue to replace a considerable amount of bleached sulfite, which apparently reached its peak several years ago. Shortages of bleached market sulfate pulp are expected to continue for a number of years in the United States. Data are tabulated showing the rapid growth in the production of bleached pulps and in the production and consumption of various grades of paper and boxboard. R.R.

GRAHAM, K. Ireland's paper industry. Paper & Print 22, no. 3: 248-50 (Autumn, 1949); Am. Paper Merchant 46, no. 10: 24-5 (October, 1949).

The author gives brief histories and considers the present production of the four paper mills which comprise the Irish paper industry. Their production has risen from about 1500 tons in 1928 to 20,000 tons in 1948. It is hoped that the annual total will reach 28,000 tons which, it is estimated, would supply the paper requirements of the country except for newsprint. R.R.

POWERS, W. C. British paper-making industry, 1949. Indian Pulp and Paper 4, no. 1: 40, 47 (July, 1949).

With greater imports of esparto grass, Scandinavian wood pulp, finished paper, and board, the British paper industry has ample supplies of fine writing and high-class printing papers for domestic use and a fairly large tonnage for export. Newsprint production is only 55% of the prewar figure. At present the British Government has high-priced Scandinavian pulp on hand which the mills do not want to buy because of the price. If this difficulty can be settled, it is hoped that the permitted output will be increased and that the Paper Control will be terminated in 1950. R.R.

PAPER AND PULP MILLS

ANON. Canada's newest pulp mill. Indian Pulp and Paper 4, no. 1: 64-8 (July, 1949); *cf.* B.I.P.C. 19: 808.

A description is given of the new Kimberly Clark Corp. subsidiary, the LongLac Pulp and Paper Co., Ltd., and the town of Terrace Bay, Ontario. Illustrations of the mill are included. R.R.

ANON. New Chartham mill opened. World's Paper Trade Rev. 132, no. 12: 752, 754, 756, 776 (Sept. 22, 1949); Paper-Maker (London) 118, no. 4: 244, 246, 248, 253, 256 (October, 1949).

Brief reference is made to the opening ceremonies of the rebuilt Chartham Mill at Kent, England, designed to produce "Gateway" tracing paper and operated by William Howard and Son on behalf of Wiggins, Teape & Co., Ltd. The paper machine, built by Bentley and Jackson, Ltd., Bury, is one of the most specialized machines in the country. It is now producing greaseproof paper until the machine is broken in and its performance is well known and understood, at which time the manufacture of tracing paper will be started. E.S.

ANON. New filtration and bleach plant; U. S. paper company's modern installation. World's Paper Trade Rev. 132, no. 15: Tech. Sup. 86-8 (Oct. 13, 1949); *cf.* B.I.P.C. 20: 101.

A brief description is given of the new installations in the water filtration and bleach plant of the Minnesota and Ontario Paper Co. at International Falls, Minn. E.S.

ANON. Paper mills of India. Orient Paper Mills Limited. Indian Pulp and Paper 4, no. 1: 26-8 (July, 1949).

A discussion is given of the Orient Paper Mills Ltd., an industrial colony which was established in 1936 and began producing kraft and machine-glazed papers in February, 1939. Production has now reached 40 tons daily of paper and board; it is expected that the installation of the fourth paper machine

in 1950 will raise the figure to 80 tons. Rags and bamboo are the fiber sources. R.R.

ANON. Robinsons of Chesterfield. Paper & Print 22, no. 3: 300, 302, 304, 307 (Autumn, 1949).

An illustrated history is given of Robinson & Sons, Ltd., which began operations as a manufacturer of pillboxes in 1839. The company now has five factories in Chesterfield which make paper and board products for almost every industry and are the largest British producers of cellulose wadding. R.R.

DAVIDSON, J. H. Equipment for heating and ventilating a bleach plant. Tappi 32, no. 10: 463-5 (October, 1949); *cf.* B.I.P.C. 20: 101.

The equipment for heating and ventilating the bleach plant of the Minnesota and Ontario Paper Co. at International Falls, Minn., is described. E.S.

EVANS, JOHN C. W. The pulp and paper industry in New Brunswick. Pulp Paper Mag. Can. 50, no. 10: 89-92 (September, 1949).

A brief illustrated description is given of the seven separate mills in the province (five in operation, one under construction, and one being rebuilt after a fire), including the groundwood, sulfite, and board mill of Fraser Companies Ltd., Edmundston, and their unbleached kraft pulp mill under construction at Newcastle; the rebuilt groundwood mill of the St. George Pulp and Paper Co., which was completely destroyed by fire in 1946; the sulfite mill of Saint John Sulphite Limited, the groundwood, sulfite, kraft, and board mills of the Bathurst Power & Paper Co., the newsprint mill of the New Brunswick International Paper Co., and the bleached sulfite and dissolving-pulp mill of Restigouche Co. Limited, a subsidiary of the Fraser Companies Ltd. The mills are operating at or near full capacity with the exception of the Dalhousie newsprint mill of the New Brunswick International Paper Co., where operations are curtailed by a shortage of electric power caused by an exceptionally dry summer. E.S.

STEPHENSON, J. N. Canada's past decade in pulp and paper. Indian Pulp and Paper 4, no. 1: 18 (July, 1949).

A brief summary is given of Canadian mills built or considerably improved within the last three years. R.R.

PAPER MANUFACTURE

CRAIG, F. A. Practical paper making. Paper & Print 22, no. 3: 245-7 (Autumn, 1949).

This is the first of a series of articles and presents a summary of the papermaking process and a brief consideration of the fibers used. R.R.

TAPADAR, D. C. Chemical engineering in the paper industry. Indian Pulp and Paper 4, no. 1: 42-4, 46-7 (July, 1949).

A general summary is given of pulp and paper manufacture, including mechanical, semichemical, and chemical pulping. The author emphasizes the desirability of having a chemical engineer for control work. 11 references. R.R.

PAPER SIZING

PERELYGIPA, A. I. Wax sizing of paper. Bumazh. Prom. 24, no. 4: 16-19 (July-August, 1949). [In Russian]

Considerable research has been devoted to the preparation of wax emulsions in the Goznak mill laboratories; with an increasing demand for high-quality photocopying paper, wax sizing has acquired particular interest. Laboratory tests have established the optimum chemical and physical conditions for obtaining a stable emulsion; mechanical dispersion has not been considered. Stearin, containing a mixture of solid palmitic and stearic acids (sp. gr. 0.85, m. p. 63-69° C.), is used as the emulsifier; gelatin is introduced as a stabilizer or protective colloid, retarding the rate of coagulation; borax (sodium tetraborate), a mild alkali, is added to saponify the stearin. It was found that a very stable emulsion could be produced in the laboratory with the following formulation: 100 kg. of paraffin, 20 kg. of stearin, 10 kg. of gelatin, and 8 kg. of borax. The optimum concentration of borax solution is 1%; however, satisfactory emulsions can be prepared with 0.2-2.0% solutions. The stability of the emulsion depends on the pH of the system; in an alkaline medium, the stability is increased; in an acid medium, the emulsion coagulates. It is necessary to maintain a fixed temperature during the cooking, emulsification, and dilution processes, especially during dilution. The cooked wax size should be cooled to the solidification point of the paraffin before dilution with water. The water temperature must be the same as that of the size at the instant of dilution; a sharp difference in temperature causes coagulation of the emulsion. A drawing of the process equipment is included. A table furnishes comparative data on wax and rosin sizing of envelope, gasket, photocopying, tabulating, and high-quality writing paper; the percentage composition of starch, rosin, alumina, and wax is given for each paper. E.G.S.

PAPER SPECIALTIES

ANON. Industrial sales opportunities. Possibilities for paper sales where you may least expect them. Paper & Twine J. 23, no. 8: 11-12, 18-20 (October, 1949).

Among the possibilities for unexpected sales outlets are automobile manufacturers, who use paper seaming cord for welting and seaming upholstery, masking tape, and antitarnish tissue. Breweries are good prospects for coasters and mats for advertising, beer-bottle bags, and labels. The cap and hat industry uses a special board for the inside of the visor, tissue for stuffing, bogus paper for lining shipping cases, hat boxes, and case-lining paper. Cheese makers use large quantities of wrapping paper, as do clothing manufacturers, who also need pattern paper. Sales possibilities to candy factories include wrappings, ribbons, cellulose padding, divider boards, candy cups, etc. Makers of cutlery need antitarnish and etching tissues. Butter wraps, egg cartons, milk-bottle caps, etc. are used by dairies, and flour mills use quantities of paper flour sacks and car-liner papers. The furniture industry uses light-weight kraft for wrapping, masking tape, seaming cord, indented paper and board for protection during shipping, and paper padding. R.R.

ANON. Modern shipping practices boost use of decorative papers. Packaging Parade 17, no. 201: 87 (October, 1949).

Decorative functional wrapping papers, which are removed before the product is put on display, are being used in increasing quantities. They are usually of heavier stock than that used for the retail trade and are selected for their functional performance as well as decorative value. Illustrations are included. R.R.

ANON. Pre-colored margarine. Modern Packaging 23, no. 2: 90-1 (October, 1949).

Standard Brands Inc. is marketing colored oleomargarine in ¼-pound prints wrapped in laminated aluminum foil and packed four to a flat, square, paperboard window carton. The wrap is a lamination of light-weight parchment and aluminum foil which preserves the color and flavor of the contents and can be easily used on high-speed automatic packaging machinery. R.R.

BEAM, MAURICE J. Potters steal a march. Natl. Lithographer 56, no. 10: 38, 96, 98 (October, 1949).

A brief description is given of the technique of ceramic gravure printing, which consists in placing engraved designs upon a web of fine pottery tissue paper, which is cut off by hand at intervals by the press operator. At this stage, the ink is still warm and slightly tacky. The tissue sheets go at once to skilled workers who rapidly cut out separate designs and transfer them, ink side down, to ceramic shapes. The design is implanted on the enamel not in reverse, but in the manner in which it will appear upon the pottery. Under the intense heat of the kiln, the colored oxides merge in permanent fusion with the pottery clay, thereby forming pictures in the lovely tints which are possible in ceramic decoration. E.S.

FACHKUNDE-KARTEI. Carbon paper. Allg. Papier-Rundschau no. 9: 442-4 (Aug. 30, 1949). [In German]

Supplemented by illustrations, the manufacture, raw materials, available sizes, most suitable storage conditions, and various types of German carbon paper are described. This is chart W B 4 of a series. E.S.

FAIRCHILD, DON. Industrial paper bags and flexible packaging. Univ. Illinois Bull. Eng. Exp. Sta. Circ. Ser. No. 56: 66-70 (April, 1949).

The trend toward flexible packaging means smaller unit packaging and more protection for each package. The small unit reduces the amount of spoilage when the contents are contaminated and is easily handled. Package specifications set up by the government during the war are still standard for most industries; the number of such specifications will probably increase and they will very likely be standardized for regular domestic and export shipments as well as for government purchases. The bag-in-box is described, which usually consists of a corrugated carton or fiberboard box with bags of kraft, waxed, coated, or parchment papers, plastic films, or laminates. The possibilities of polythene are emphasized. R.R.

HANSEN, HARRY L. Dairy packaging. Univ. Illinois Bull. Eng. Exp. Sta. Circ. Ser. No. 56: 217-20 (April, 1949).

Statistics of the dairy industry are given, followed by a discussion of paper milk containers in general, the Zinpak Never-Leak container for liquids, and the Zin-Pakage Maker. The unit is ideal for the high-speed packaging of milk, frosted foods, cottage cheese, oils, etc. R.R.

MACKENZIE, F. W. Screen process printing. No. 3. Screen printed wallpapers. Paper & Print 22, no. 3: 272, 274, 276 (Autumn, 1949).

The development of the screen printing of wallpaper in England has been slow, because producers of high-class hand-printed papers have favored

block printing and stenciling. Single- and multicolor printing, screen preparation, colors, designs, and mechanical screen printing are briefly discussed and illustrations of typical designs are given. R.R.

PAPER SALES. There's no depression in building. Paper Sales 9, no. 10: 22-3, 42, 44, 46 (October, 1949).

One of the basic items in the building industry consists of various building papers and boards, orders for which may approach and exceed carload lots. The paper salesman usually works with asphalt-laminated, coated, cord-reinforced, triplexed, and copper-reinforced waterproof sheathing papers, which are briefly described. Among the other products used in construction work are portable water carriers and paper cups, tags for marking, extra-strength pressure-sensitive tape, gummed sealing tape, flexible paper tubing, and kraft wrapping paper. R.R.

WACHTER, AARON. V.P.I. papers. Univ. Illinois Bull. Eng. Exp. Sta. Circ. Ser. No. 56: 81-7; discussion: 88-91 (April, 1949); *cf.* B.I.P.C. 19: 311.

This article is essentially similar to the earlier one, with more experimental data and the discussion added. R.R.

PAPER SPLICING

CAFALL, CHARLES. Rotary printing, blanking . . . pioneering with the boxmaker. Am. Boxmaker 38, no. 10: 10-13 (October, 1949).

A typical installation of the Ford Instrument Co.'s automatic butt-splicer on a web-fed rotary printer and blanker is that used for Super Suds cartons. The operation of the equipment used is described and illustrations are included. R.R.

PENETRATION

BRYDE, Ø. The significance of penetration in the sulfite cook; the possibility for improving penetration by artificial means. Norsk Skogind. 3, no. 7: 169-72 (July, 1949). [In Norwegian; English summary]

In the sulfite process a considerable part of the cooking cycle is required for heating the digester contents to the required cooking temperature. Although a shortening of this period can be obtained by preheating the liquor prior to its admission to the digester, the slow penetration of the bisulfites into the chips at temperatures above 110° C. prevents the application of this shortcut. However, it has been postulated that, if the chips were pretreated with gaseous ammonia, penetration would no longer be retarded and the cooking liquor could be admitted at the final cooking temperature. This theory has been confirmed by the present laboratory experiments, the details of which are described. Pretreatment with both ammonia and sulfur dioxide in gaseous form was also tried and the results showed that the long penetration period could thereby be reduced. Even pine heartwood chips, when treated in this manner, could be completely digested and yielded sulfite pulps of standard quality. 1 diagram, 3 tables, and 11 references. E.S.

PHOTOGRAPHY

BROWNING, B. H. Photography as an aid to the paper mill

chemist. Indian Pulp and Paper 4, no. 1: 54-5, 57, 59 (July, 1949).

The author describes the various applications of photography in the paper mill, the laboratory, and the control department and considers the technique of producing good prints. R.R.

PHYSICAL TESTING—FASTNESS TO LIGHT

DOSSMANN, HILDE. Light fastness of printing inks for the graphic arts. Angew. Chem. B 20, no. 9: 232-4 (September, 1948). [In German]

This investigation of the light fastness of printing inks involved the study of 22 ink colors. The test prints were exposed for periods of 100 to 480 hours to the light from a 500-watt lamp. The spectral distribution of the light was considered to be approximately that of daylight. The reflectances of the specimens were determined at 16 wavelengths through the visible spectrum, before and after exposure, and spectral reflectance curves were plotted. From the reflectance curves, an index of color change or fading was calculated. 3 tables and 9 figures. G.R.S.

PHYSICAL TESTING—PAPER—COMPRESSIBILITY

GAVELIN, GUNNAR. The compressibility of newsprint. Svensk Papperstidn. 52, no. 17: 413-19 (Sept. 15, 1949). [In English; German and Swedish summaries]

An investigation of the ability of newsprint rolls to resist heavy pressure during transport and storage led to a study of the compressibility of newsprint paper. An instrument, called pressure balance, was developed for this purpose; it consists of a balance with a capacity of two tons and an arrangement for pressing a pile of paper against the balance by means of a piston actuated by a screw. The instrument permits the measurement of elasticity and primary (reversible) and secondary (irreversible) creep. Theoretical considerations are included, applying Steenberg's paper model (originally developed for stress-strain relations) to the compression of paper. The results of a few studies with the instrument are described, illustrating the effect of moisture in paper on its compressibility and the need for conditioning all samples to be tested and its use for differentiating newsprint of different hardness; a considerable difference in quality was found between samples from four mills. The same samples were tested for bulk, porosity, Bendtsen hardness, and Bendtsen smoothness, but none of these gave the same classification as that obtained with the pressure balance, so that it seems that the instrument reveals properties hitherto not recorded. A relationship was found to exist between irreversible creep and freeness values of the groundwood pulp, verifying the opinion held by practical papermakers that a high freeness will yield a soft paper and vice versa. The reversible compressibility or primary creep is far more constant and a relationship with the wood quality is postulated. Elasticity was found to follow the values given by the Bendtsen hardness. 13 diagrams. E.S.

PHYSICAL TESTING—PAPER—OPACITY

NORDMAN, L. The opacity of paper and the factors which influence it. Svensk Papperstidn. 52, no. 18: 441-7 (Sept. 30, 1949); Finnish Paper Timber J. 31, no. 18: 328-35, 345 (Sept. 30, 1949). [In Swedish and Finnish; English and German summaries]

A brief summary of the Kubelka-Munk theory of the scattering and

absorption of light in paper is given. The calculation of the scattering coefficient of transparent papers from the values R_0 and $R\infty$ was simplified by a chart developed by the Central Laboratory in Finland. The specific external surface of pulp was determined by Clark's method (*cf.* B.I.P.C. 12: 397-8). Based on the specific surface of pulp and the scattering coefficients of handmade sheets, some factors affecting the opacity of paper have been analyzed. A bleached sulfite pulp was beaten in a Valley beater, a Lampén mill, a Clark kollergang, and a Turmix disintegrator, and the scattering coefficients were plotted against the specific external surface. Comparison by the same specific surface shows that the S.-R. beating degrees and the scattering coefficient S' vary with the type of beater. A low opacity does not always follow from high S.-R. values. Different samples of sulfite pulp were beaten in a Valley beater and the specific surface and the scattering coefficients were plotted against beating time. The rate at which the specific surface increases and the scattering coefficient decreases according to fiber bonding is high in the first stages of beating; this indicates that a portion of the pulp is more readily beaten to a slimelike condition than the bulk of the material. The easily beaten portion, the increase of the specific surface, and the decrease of the scattering coefficients/unit of time vary for different kinds of pulp. Wet pressing reduces the scattering coefficient in the same way as beating, as illustrated in a diagram. The effect of wet pressing is smaller for beaten pulp on account of the flexibility of the beaten fibers. Fine groundwood, on the other hand, is more affected than coarse groundwood because of the higher amount of accessible latent fiber bonds in the former which, after pressing, form active fiber bonds. The influence of fiber bonding upon the value of the scattering coefficient is demonstrated by the results of some experiments, which were carried out to prevent or diminish the formation of fiber bonds; either wet sheets or pulp were treated with acetone, and the pulp was formed into sheets in benzine. These treated sheets were then compared with standard sheets. Another factor affecting the opacity is the absorption coefficient K', which is greatly affected by the addition of dyestuffs to the furnish. Opacity measured as $CR_{0.89}$ and brightness depend entirely upon the absorption value obtained by dye additions and not upon the type of the dyestuff. 13 figures and 5 references. E.S.

PHYSICAL TESTING—PAPER—WET RUB

BLACK, W. C. A method for comparing the wet-rub resistance of coated papers. Tappi 32, no. 10: 467-8 (October, 1949).

A rapid and relatively simple procedure is described, which gives consistent results and is adequate for the comparison of most coated sheets. It comprises rubbing an immersed coated test sample with a soft bristle brush for a measured time and with a measured pressure. The coating solids removed are decanted and then estimated with a simple turbidimeter or nephelometer. Since the immersion time, rubbing time, speed, and pressure may all be varied, the method can easily be adapted to a wide range of coatings. 1 diagram of the apparatus. E.S.

PHYSICAL TESTING—PAPER—WET STRENGTH

GAVELIN, GUNNAR, and FORSBERG, ERIK. Wet-strength determination of paper as mill-control method. Svensk Papperstidn. 52, no. 17: 420-3 (Sept. 15, 1949). [In Swedish; English and German summaries]

The authors describe a simple method for determining the wet strength of paper by means of a chain balance, including the details of the setup, method of sample taking, and actual testing procedure. Several examples of

the use of the method in production control are given, illustrating the influence of sulfite percentage (in newsprint), finest fiber fraction, salt water, wetting agents (sodium alkyl sulfate), pH, alum, hexametaphosphate, and beating on wet strength. 9 figures. E.S.

SCHRÖTER, HELMUT. Contribution to the knowledge of the wet strength of pulp sheets. Das Papier 3, no. 15/16: 297-304 (August, 1949). [In German]

The author discusses the two concepts of wet strength in paper: (*a*) the so-called initial wet strength of the web during the formation of a sheet and (*b*) the more commonly accepted concept of the wet strength of the finished sheet. Inasmuch as complaints are frequently made regarding this low initial wet strength, the author devised a special apparatus for its measurement. The instrument consists essentially of two flat horizontally placed glass plates, one of which is fixed, whereas the other is movable. At rest both plates are contiguous and in the same plane. The web is couched so that it covers both plates and so as to insure uniform adhesion. The movable plate is attached to the indicator of a special balance, one arm of which holds a light aluminum container, counter-balanced on the other arm by a suitable rider, when the balance is at rest. The dimensions of the mechanism and operation of the apparatus are described in detail and a sketch is given. Water is added slowly to the aluminum container which causes the one glass plate to move horizontally and the couched web to tear. The weight required to just cause tearing of the sheet is the tensile load. Graphs are given showing the influence of dry weight on the thickness and bulk of a paper web and on its initial wet strength. The increase in wet strength in chemical pulp and groundwood from an initial dry weight of less than 10% to that of the finished sheet (containing less than 10% water) is also shown graphically. Similarly, data are given (1) on the relationship between thickness, weight/unit area and dry weight, (2) wet strength, weight/unit area and dry weight, (3) the influence of weight/unit area on the breaking load at varying moisture contents (1-3 groundwood sheets), (4) wet strength as a function of the dry weight with varying weights/unit area (chemical pulp sheets), and (5) initial wet strength as a function of the degree of beating (degrees S.-R.). A high tensile strength when dry does not insure a high wet strength. Marked differences in (dry) tensile strength between two different stocks are not necessarily reflected in their relative wet strengths. The course of wet strength development on beating is no criterion of the development of tensile strength when the sheet is dried. 10 graphs. L.E.W.

PIGMENTS

ANON. Titanium pigments in the paper mill. Indian Pulp and Paper 4, no. 1: 22, 24 (July, 1949).

The discovery and early history of titanium and the use of titanium pigments, particularly its dioxide, in the paper industry are briefly considered. R.R.

PITCH TROUBLES

GAVELIN, GUNNAR. The effect of hexametaphosphate on pitch troubles in the paper mills. Pulp Paper Mag. Can. 50, no. 10: 109-15 (September, 1949); *cf.* B.I.P.C. 18: 38-9.

With reference to Freeman's beneficial results obtained with Calgon added to the white water for the suppression of pitch troubles in a newsprint mill, the author states that his experience in a Swedish mill substantially confirms Freeman's findings. However, the effects of Calgon on the white-water

system are very complicated and seriously affected by pulp and water qualities. The explanation of the phenomenon may be found in the fact that Calgon, under certain conditions, is adsorbed in a very fine film on wet surfaces; this adsorption is very dependent upon acidity, temperature, Calgon concentration, velocity of flow, and surface properties. The relationships between these properties in paper mills need further study and clarification. Calgon will also increase the wet strength of paper considerably under certain conditions; the pitch will simultaneously become quite harmless on account of the dispersion of the pitch particles, when stirring is used, or of a kind of sizing reaction (no true sizing) without stirring. These conditions should also be more thoroughly investigated. For the two years the Swedish mill has been adding Calgon to the white water, the paper machines have been running with less trouble than ever before. Attempts to stop the Calgon dosage have always been short-lived. In spite of serious microbiological contamination of the white water system, no slimicide has been found necessary. In addition, Calgon is an acknowledged inhibitor of corrosion. The results given in this article do not claim to have solved the fundamentals of the reactions involved; however, they may be considered a step in the right direction. 3 tables, 15 diagrams, and 4 references. E.S.

PLASTIC FILMS (NONCELLULOSIC)

VISKING CORPORATION, *Chicago.* Tests reveal polyethylene liners cut shipping costs. Packaging Parade 17, no. 201: 86 (October, 1949).

Savings resulting from the use of polyethylene liners in fiber and metal shipping containers are reported. Their use as liners for returnable steel drums eliminates reconditioning and permits the receiver to place the drum back in service immediately. In some cases it permits the use of easily handled, lightweight fiber drums instead of heavy metal containers. Because the liner can be squeezed to remove its contents completely, more of the contents can be recovered than when steel drums are used. Although the liner can be positioned by pushing it into the drum, the use of a mandrel—a fiberboard cylinder is suggested—assures greater smoothness. When the container is filled, an octagonal sheet of polyethylene can be placed over the contents and the drum head secured; the edges of the liner project to form a gasket. With some products, it is advisable to twist the liner top into a neck and tie it. R.R.

PLASTICS—FILLERS

WILLIAMSON, R. V., and LATHROP, E. C. Agricultural residue flours as extenders in phenolic resin glues for plywood. Modern Plastics 27, no. 2: 111-12, 169-70, 172, 174 (October, 1949); *cf.* B.I.P.C. 20: 34.

Thirteen agricultural-residue flours (wheat straw, corncobs, flax shives, cottonseed hulls, a corncob lignin concentrate, and English walnut, pecan, hard almond, peanut, and apricot pit shells) were evaluated as extenders in plywood glues made with a laboratory-prepared liquid phenol-formaldehyde resin and were found to permit savings of 21-48% of resin. Three commercial resins (a liquid and powdered phenol-formaldehyde resin and a liquid resorcinol resin) were extended with such flours, with a saving of up to 50% of resin. The greatest economy of resin was obtained by the use of flours with resins that produced glues of low consistency for a given amount of resin solids. Glued specimens alternately soaked in water and dried at 105° C. for half-hour periods for four days retained strip shear

strengths at least equal to those of the original specimens before soaking. The percentage of wood failure in plywood tests furnishes no information regarding the properties of a glue other than the relative strengths of the glue and the wood. Data on the properties of plywood glues made with phenolic resin and agricultural-residue flours are tabulated. R.R.

PLASTICS—TESTING

LAMB, JOHN J., ALBRECHT, ISABELLE, and AXILROD, BENJAMIN M. Mechanical properties of laminated plastics at −70°, 77°, and 200° F. J. Research Natl. Bur. Standards 43, no. 3: 257-89 (September, 1949).

Laminates of an unsaturated polyester reinforced with glass fabric and of phenolic resin reinforced with asbestos fabric, high-strength paper, cotton fabric, and rayon fabric were tested in impact, bending, tension, and compression at −70, 77, and 200° F. Special apparatus was constructed for conducting the tests at the extreme temperature conditions. The impact strength of the glass-fabric laminate increases at −70° and decreases at 200° relative to 77° F.; the impact strengths of cotton- and rayon-fabric laminates decrease at −70° and increase at 200° F.; the paper and asbestos-fabric laminates have small changes in impact strength with temperature. The flexural, tensile, and compressive strengths and moduli of elasticity increase at −70° and decrease at 200° relative to the 77° F. values. Tests made at room temperature after heating the materials at 200° F. for 24 hours indicate that prolonged heating with consequent loss of moisture content and further cure of the resin may offset the effect of high temperature alone. In flexural tests made at 150° F. and 90% R.H., two laminates showed considerable loss in strength. 8 tables, 43 figures, and 19 references. E.S.

MAXWELL, BRYCE, and RAHM, L. F. Impact testing of plastics: elimination of the toss factor. ASTM Bull. no. 161: 44-7; discussion: 47-8 (October, 1949).

A new method of measuring the impact strength of polymeric materials is presented which eliminates some of the extraneous energies measured by the standard Izod test, the most important of which is the energy to toss the broken half of the sample. The apparatus is described and the data obtained for several materials by the new method and the standard Izod method are tabulated. Comparison of results show that this new method ranks materials in the proper order as indicated by service performance of the materials. Experiments are described which lead to the conclusion that the impact strength as determined by this new method is independent of the mass of the broken sample. This permits testing over a wide range of velocities to which this method is easily adapted. 5 figures and 7 references. E.S.

PRINTING AND PRINTER'S INK

WOODRUFF, A. B. How paper affects press efficiency. Am. Printer 129, no. 4: 46 (October, 1949).

Among the factors which affect the ease with which a press handles paper or which limit the paper stocks that can be used in a press are such paper characteristics as grain direction, rigidity, nature of the surface, thickness of the stock, moisture content, and the presence of waviness or curl. The speed of the press, a heavy coating, humidity in the pressroom, and the presence of static electricity are additional influences. R.R.

PULP—REACTIVITY

MELLER, ALEXANDER. Reactivity of fibrous cellulose. J. Polymer Sci. 4, no. 5: 619-28 (October, 1949).

By applying hydrochloric acid solution at different temperatures to various fibrous cellulose samples and following the percentage loss in weight with time, hydrolysis-time curves have been obtained. These plots have been resolved into a straight line and a curve, representing the rate of removal of difficultly and easily removable components, respectively. Under the experimental conditions applied, the rate-determining reaction in the removal of the difficultly accessible components from the fibers is essentially a zero-order reaction. This was borne out by the results of hydrolyses of hydrocellulose preparations. Within the experimental range the temperature coefficient of this rate is independent of the representative fibrous materials and is relatively high, corresponding to an energy of activation of 28-29 kcal./mol. The easily and difficultly accessible regions, assessed by resolving the rate plots, are different with the same fibers, depending on the experimental conditions. The reactivity of both the easily and difficultly hydrolyzable constituents varies with different cellulose fibers. The complex nature of the kinetics of removal (hydrolysis) of the easily accessible components is discussed. 1 table, 3 figures, and 30 references. E.S.

RADIOACTIVITY

MARTAING, JACQUES. From the atomic bomb to papermaking, thanks to the isotopes. Papeterie 71, no. 9: 339, 341, 343, 345 (September, 1949). [In French]

A general description is given, in which a few paragraphs are devoted to the possible uses of isotopes in the paper industry. 8 footnotes. L.E.W.

RAYON—VISCOSE PROCESS

MITCHELL, R. L. Viscose processing of cellulose; changes in basic properties. Ind. Eng. Chem. 41, no. 10: 2197-2201 (October, 1949).

Changes in degree of polymerization, α-cellulose, carboxyl, and pentosan content which occur during the steeping, aging, xanthation, and spinning stages of viscose processing are shown for several pulps of different initial degrees of purity. Special consideration is given to depolymerization reactions since the permanent drop in degree of polymerization has perhaps the greatest effect on the other basic analytical properties of the cellulose. Some effects of time, temperature, and oxygen concentration on the extent and type of alkaline degradation are shown. The presence or absence of oxygen may be the factor determining which of two types of alkaline degradation will occur. A special recovery technique is described for retaining low degree of polymerization gamma constituents as the water-insoluble nitrate derivatives. 3 tables, 8 figures, and 13 references. E.S.

SAMUELSON, OLOF, and JONSÉN, HEIMER. Investigations concerning the filtering properties of viscose. II. The influence of sodium silicate and calcium chloride upon the filtering properties of viscose. Svensk Papperstidn. 52, no. 18: 448-50 (Sept. 30, 1949). [In German; English and Swedish summaries] *cf.* B.I.P.C. 16: 301; 19: 110-11.

Checking the experimental results of Vuori on filter clogging through

additions of sodium silicate and calcium oxide (*cf.* B.I.P.C. 16:572), the influence of 0.5% sodium silicate in the steeping liquor and of 1% calcium chloride in the pulp on the filtering properties of viscose has been studied. No influence on filter clogging could be observed, except in experiments with a very tight filter, where a slight increase in the clogging constant was obtained when a calcium chloride-treated pulp was used in combination with a steeping liquor containing silicate. Viscoses have also been prepared using a dissolving liquor containing 0.25 to 2 grams sodium silicate/liter. No effect on filter clogging could be detected. However, a considerable increase in the clogging constant was observed when a dissolving liquor was employed which contained precipitated calcium silicate. 4 tables and 5 references.
E.S.

RESEARCH

BHATNAGAR, S. S. Research for the paper industry. Indian Pulp and Paper 4, no. 1: 9-11 (July, 1949).

Following a brief consideration of the growth of the industry in India from 1914 to the present time, the author emphasizes the need for industrial research. The advantages of a research association, such as other industries have established in India, are outlined. R.R.

DOSKER, C. D. Significance of research to industry. Paper Trade J. 129, no. 16: 44-5 (Oct. 20, 1949).

The forest-products industries have made relatively little investment in research in the past, far less than has been invested by producers of products competitive with wood. The Forest Products Research Society can be a strong force in directing attention to developments resulting from research and research needs. The stimulation of research interest resulting from Society activity already is being felt, but it must be increased manifold before the forest products industries are abreast of competitors and are in a position to compete not only in markets but in attracting to the industries the type of research talent needed to insure progress in developments.
E.S.

MALOTT, DEANE W. Bringing research to the service of American industry. Norsk Skogind. 3, no. 9: 216-25; discussion: 25 (September, 1949). [In English; Norwegian summary and discussion]

The author reviews the development of research in the United States under the sub-headings: Federal Government research, State Government research, research through philanthropic foundations, university research institutes, trade association research, research by industrial corporations and firms, and private profit and nonprofit research agencies. A few examples of industrial research are given and, in conclusion, the administrative policies and problems of research administration are discussed. E.S.

RESEARCH LABORATORIES

ANON. Testing of containers; PATRA's enlarged packaging service. World's Paper Trade Rev. 132, no. 13: 3-4 (Sept. 29, 1949).

Brief reference is made to the new packaging laboratory of the Printing, Packaging and Allied Trades Research Association at Leatherhead, its facilities, and the new advisory service set up to keep industry advised on technical developments in packaging. This service is free to members of

the Association and available to nonmembers on a fee-paying basis. 2 illustrations. E.S.

NYBERGH, BERTIL. The activity of the Central Laboratory during 1948. Finnish Paper Timber J. 31, no. 17: 305-7 (Sept. 15, 1949). [In English]

A general review of the 1948 activities of the Central Laboratory, Helsingfors, Finland, is given, including very brief discussions of some of the research problems of the pulp-cooking, bleaching, rayon and cellulose, biological, analytical, strength-testing, organic, groundwood, paper, board, and fiber-morphology departments. A few of these problems are discussed separately in greater detail by the respective department heads. E.S.

RESIN, SYNTHETIC

MILLER, D. C. R. Silicones and their uses in industry. Parts I and II. Can. Chem. Process Inds. 33, no. 9: 764-7; no. 10: 858-66, 870 (September, October, 1949).

In the first part of the article, the origin, structure, and general properties of silicones are reviewed; the second part deals with industrial applications. Among these, the addition of certain silicones to paper in the beater has been tried, but there are some indications that such treatment is not permanent, perhaps because of the slow attack by residual carbonates in the paper. A more promising method seems to be the use of an emulsion with a catalyst to reduce curing temperatures to 250° F. or lower; this is preferably applied in the size box or as a fine spray or coating at the calender stacks. A 1% pickup will confer marked water repellency to medium- and hard-sized papers, with no appreciable effect on color and gloss. The outer facing of boxboard or corrugated containers, wrapping papers, and box liners may be treated in this manner for imparting water repellency. The treated papers do not stick to adhesive materials such as Scotch tape and can, therefore, be employed in the rubber industry as a substitute for Holland cloth applied in rubber interleaving or rubber electrician's tape. 40 references. E.S.

SHIPPING CONTAINERS

GAIR, ROBERT, COMPANY, INC., *New York*. Cheese box with interlocking bottom. Fibre Containers 34, no. 9: 58-9 (September, 1949); *cf.* B.I.P.C. 19: 804.

A brief illustrated description of a solid fiberboard box of Vus board is given, which requires no tape, staples, or glue in sealing the bottom flaps. It is intended for bulk packing of cheese in net weights up to 15 pounds. The closing of the box is achieved by a patented method using flaps equipped with interlocking tabs; the container was approved for freight shipment. E.S.

GAYLORD CONTAINER CORPORATION, *St. Louis, Mo.* The Gaylord Drumpak. Fibre Containers 34, no. 9: 68 (September, 1949).

A brief illustrated description of the Drumpak is given, which involves a wooden frame, an outer corrugated body, and a solid fiber skid. The container is at present used for the shipment of automatic washing machines, but is considered adaptable to many other heavy products. E.S.

GRUNDY, A. V. Current packing needs of the Quartermaster

Corps. Univ. Illinois Bull. Eng. Exp. Sta. Circ. Ser. No. 56: 130-1 (April, 1949).

For the domestic shipment of canned goods and nonperishable items in fiberboard containers by the Quartermaster Corps, Consolidated Freight Classification Rule 41 is followed. Certain military items must be packed in fiberboard boxes with strength characteristics greater than are specified in Rule 41. For overseas shipment, V1 and V2 containers are generally being replaced by V3s, V3z, or Vus boxes, although V2 containers are still being used for all rations. R.R.

INTERNATIONAL PAPER COMPANY. *Container Division.* Corrugated replaces keg for bolts and nuts. Fibre Containers 34, no. 9: 37-8, 40, 42, 47 (September, 1949); Am. Boxmaker 38, no. 11: 25-6 (November, 1949).

An illustrated description is given of a sturdy box for the shipment of bolts, nuts, screws, washers, rivets, receivers, and similar products, which replaces the heavier wooden boxes and kegs formerly used. The box is constructed of 375-pound test, double-face corrugated board made with 100% pure kraft liners. It consists of five parts, one regular slotted inner box, two reinforcing tubes which telescope over its top and bottom ends and meet at the center, and two design-style caps stitched to the ends of the tubes. The box was developed through the use of one of the Belsinger patents (U.S. patent 2,453,614; *cf.* B.I.P.C. 19:374) for textile products; the International Paper Co., operates under this patent and owns no special patents on the bolt and nut box. The box was introduced in January, 1948, and has been adopted by the Oldsmobile and other units of the General Motors Corp. In Supplement No. 17 of the Consolidated Freight Classification, the railroads accepted the new container. Its advantages over the wooden kegs are briefly outlined. E.S.

PARKER, PAUL A. The case history of a new pack. Univ. Illinois Bull. Eng. Exp. Sta. Circ. Ser. No. 56: 128-9 (April, 1949).

A new pack for an old established product may be desirable to reduce the package cost, increase protection for the contents, facilitate packing, and/or improve the stacking quality of the package; all of these factors must be considered when any redesigning is to be done. To illustrate, the author briefly reviews two typical problems, one involving the package redesign for jars of liquid-packed foods and the other involving inner packing for corrugated containers intended to hold bottles of liquid. R.R.

TURK, JOHN G. Scientific approach to the development of new containers. Univ. Illinois Bull. Eng. Exp. Sta. Circ. Ser. No. 56: 137-47 (April, 1949).

The steps in the development of a new shipping container include: (1) the establishment of the need for and (2) concept of a new container, (3) laboratory testing, (4) controlled shipping tests, and (5) presentation for railroad acceptance. The most satisfactory procedure in determining the need for a new container is for the packaging engineer to perform inspections at the destination to ascertain the condition of the commodity on arrival and the probable causes of damage. Examples are given of forms used for this purpose. Step (2) can be completed only by combining new ideas with a full background of experience. The Conbur impact, its modifications, the drop, drum, vibration, and compression tests are the most commonly used laboratory tests; the first three are particularly suitable for testing

shipping containers loaded with glass-packed products. The history of the materials entering into the shipping-container samples should be investigated. The results of laboratory performance tests should not be accepted without question; the numerous variables often make the interpretation of such tests difficult. It is in this field that statistics can be of great help. Tables and calculations are given to illustrate the fact that averages cannot be trusted. Suggestions are given for making controlled shipping tests for comparing the performance of the old and new containers. R.R.

SHIPPING CONTAINERS—EXPORT PACKAGING

MOUNT, JOHN. The fibreboard container in the export field. Univ. Illinois Bull. Eng. Exp. Sta. Circ. Ser. No. 56: 159-63 (April, 1949).

The author emphasizes the need for stronger containers for export shipments which have been designed for the product they carry and for the conditions to which they will be subjected. The top grades of V containers are hardly necessary for present use, but lower grades, such as Vus containers, should be considered. Shipping units of one cubic foot or less are undesirable because they are too easily concealed and stolen. Proper sealing, strapping, and marking deserve careful attention. R.R.

SHIPPING CONTAINERS—PALLETIZING

MITCHELL, J. B., JR. Purpose and application of pallets. Univ. Illinois Bull. Eng. Exp. Sta. Circ. Ser. No. 56: 103-8; discussion: 108-15 (April, 1949).

A general summary is given of pallets and their use. Mention is made of pallet trays and boxes, including containers with doors in the side to facilitate entry while they are stacked. The author's experiences with expendable corrugated-board pallets are discussed. R.R.

MORIARITY, T. F. Pallets save money. Paper Ind. 31, no. 7: 831 (October, 1949).

A brief illustrated description is given of the various types of pallets which are available in wood, metal, or corrugated board in the form of two-way or four-way entry pallets. E.S.

SHIPPING CONTAINERS—TESTING

CONTAINER LABORATORIES, INC. Effect of fatigue on stacking strength of boxes; report to Quality Control and Research Group. Fibre Containers 34, no. 9: 20, 22, 27 (September,1949).

The following preliminary tests were carried out to supply information on the relation between the top-to-bottom compressive strength of a corrugated box as measured in a laboratory and the actual load which that box will withstand, when piled in a warehouse and left there for weeks or months. The boxes were regular slotted containers, 200-test certificate, B-flute (24 No. 2-can cases), with 42-pound kraft facing, straw corrugating medium, 57-pound jute inner facing, and stitched joints, which sustained an average maximum load of 509 pounds in the flat top-to-bottom compression test. Three empty boxes were piled one above another on an absolutely level surface, a flat platform was placed on top, and weights totaling 382 pounds (three quarters of average maximum load) were carefully and gently centered on it. In less than an hour, two of the three boxes failed and the pile collapsed. In a check test, the pile collapsed in less than five

minutes. The test was repeated with 255 pounds (half of average maximum load) and at the end of eight days, there was no apparent fatigue effect. The tests were repeated with another lot of boxes with 42-pound kraft facings, strawboard walls, and taped joints, and the same results were obtained. These tests indicate that boxes, even under the most favorable conditions, should not be loaded in a pile to more than about one half of their compressive strength. Since actual shipping conditions are much more severe, it is apparent that a safe load must be considerably less than that amount. 7 illustrations. E.S.

COOKE, WARREN. Control of container quality from the user's viewpoint. Univ. Illinois Bull. Eng. Exp. Sta. Circ. Ser. No. 56: 125-7 (April, 1949).

The author presents a general consideration of performance standards for containers, with specific reference to his experiences. Solid printing on container panels, wide scores and fingerlings, and poor liner gluing were found detrimental to container quality. By improving container compression and maintaining a higher standard by periodic tests, package crushing and damage were reduced; economies were effected by eliminating the support sheets formerly needed by some packs. Railroad classification requirements must be met, but they are minimum standards and must often be surpassed. Performance standards are preferred to detailed specifications of component parts because they can usually be checked more readily. There are particular conditions and needs to which container performance tests should be related for most container uses to ensure satisfactory delivery of products to the consumer at a minimum cost. R.R.

ENDER, A. L. Development and interpretation of facsimile handling cycle test for package adequacy. Univ. Illinois Bull. Eng. Exp. Sta. Circ. Ser. No. 56: 148-51 (April, 1949).

When the Eastman Kodak Co. established a package testing program, facsimile cycle tests were set up in which the package was handled as many times and in the same sequence as in the field. A representative cross section of the company's packaged goods was followed from production to consumer —an average total of 62 handling steps—data were compiled, and each step was evaluated. The evaluation of the shipping cycle of some products requires special study. A comparison of shipments with cases run on the facsimile handling cycle shows that up to 5% of the units may be damaged in the cycle, but they receive only negligible damage in the field. When it is considered necessary to approach a zero claim record, the product is packaged to pass tests with zero damage. R.R.

SPECIFICATIONS

MARTERSTECK, P. J. An approach to container specifications. Univ. Illinois Bull. Eng. Exp. Sta. Circ. Ser. No. 56: 121-4 (April, 1949).

The development of specifications necessitates careful analysis and crystallizes the ideas of the departments involved; their issuance requires the supplier to check his materials and production methods to ensure his compliance with the standards. The author cites his experiences to illustrate an approach to specification development. R.R.

STAINS AND STAINING

DOUGLASS, PRITCHARD C., and CROSSMON, GERMAIN C. Laboratory techniques; examination of textile fibers by the "dispersion

staining" method. Textile Research J. 19, no. 10: 644-6 (October, 1949).

The "dispersion staining" method is used for observing textile fibers in colors which aid in the determination of their structure and in their identification. Fibers which are classified as striated or microscopically structureless are distinguished by this technique without the need for any special preparation of the fiber. A sample is mounted in a liquid of high dispersion which has a refractive index near that of the fiber and the fiber is identified by the resulting coloration, using an ordinary compound microscope setup for dark-field illumination. 10 references. E.S.

STARCH

KERR, RALPH W., and CLEVELAND, FRANK C. The molecular weight of the β-amylase limit dextrin from corn starch. J. Am. Chem. Soc. 71, no. 10: 3455-7 (October, 1949).

A limit dextrin has been prepared in 90% of the calculated yield from corn B-fraction using crystalline β-amylase, and its ferricyanide reducing value determined. The triacetate of the dextrin was found to be readily dispersible in chloroform and to have a specific rotation of $[\alpha]^{25}D$ of 166.5° and an osmotic pressure at 30° C. equivalent to a $D.P._n$ of 800. It was observed that the dextrin acetate tended to precipitate in fibrous form. 15 footnotes. E.S.

STEIN, HALL & COMPANY, INCORPORATED. The starch method for combining corrugated board. Shears 67, no. 682: 24, 27-8 (October, 1949); *cf.* B.I.P.C. 18: 470-1.

Certain details of the Stein-Hall process are described; the present article contains excerpts from the previous reference. E.S.

STATIC ELECTRICITY IN PAPER

REED, ROBERT F. Static, what causes it and what you can do about it. Modern Lithography 17, no. 10: 62-3, 65 (October, 1949).

Although static electricity is often called frictional electricity, evidence indicates that friction is incidental and that the charge results from close contact followed by separation. Paper so charged is for a time attracted by any uncharged body; its charge is gradually dissipated by leakage to the ground. The higher the moisture content of the paper and atmosphere, the greater the dissipation rate. The principal source of static electricity on the offset press is the impression squeeze; other sources are contact of the paper with the forwarding and feed table rolls. The most practical solution of the static problem is adequate air and paper conditioning. In letterpress printing, the minimum requirements are about 50% R.H. and a 6% moisture content in the paper; in offset lithography the minimum requirements are somewhat lower because of the thin film of moisture on the offset blanket. In pressrooms that are not air conditioned, it is often necessary to install a static eliminator. The general types of eliminators, i.e., gas flames, ground devices, high-tension static neutralizers, and radioactive ionizers, are described and some are illustrated. The effectiveness of any type depends on its location on the press and its distance from the paper. R.R.

STATISTICAL METHODS

ARIBERT [MARCEL] and RUTHON. Deviations in the determina-

tion of the physical properties of paper. Papeterie 71, no. 3: 78-9, 81-3, 85, 87, 89 (March, 1949). [In French]

The authors analyzed the accuracy of paper-testing results by preparing frequency curves of the mean, maximum, and extreme deviations obtained in testing about 500 writing and printing papers from 20 different mills for tensile strength, burst, double folds, porosity, and sizing. The results of this statistical study are given in eight tables and 12 diagrams and their use is discussed for determining the origin of these deviations, papers giving the greatest deviations, physical tests yielding the most accurate data, etc.; the possibility of using the data as a basis for pricing is considered. E.S.

STEAM TURBINES

SPAHR, J. C. Paper mill turbine selection. Tappi 32, no. 10: 472-80 (October, 1949).

As fuel costs increase it is more important than ever to select the right turbine for the job. This can be done if the turbine is selected on the basis of a thorough knowledge of the plant requirements. Plant analysis similar to that illustrated is of utmost importance in obtaining a successful turbine installation. Further savings in fuel costs are made possible by the application of feed-water heating cycles. Satisfactory operation of a modern industrial turbine depends almost entirely on the control system. The control system illustrated clearly shows that practically any type of operating requirements can be satisfied automatically by the turbine. The opportunities for reduced plant costs resulting from standardization should be given full consideration. In this connection technical associations such as TAPPI, with the assistance of the manufacturers, should take the lead in establishing the standards. 16 figures. E.S.

STEEL STRAPPING

REED, HARRY M. Closure methods and marking. Univ. Illinois Bull. Eng. Exp. Sta. Circ. Ser. No. 56: 231-5 (April, 1949).

Strapping is used basically to strengthen and reinforce shipping containers, effect savings in over-all container and packing costs, bundle into a strong package articles which can be shipped safely without a container, and prepare palletized units of merchandise for more economical transportation and storage handling. The strapping may be a flat band of steel, tensioned and held together by a crimped steel clip, or galvanized high-tensile wire with the ends twisted in a smooth knot. Manual and automatic equipment for both types of strapping is available, but the adaptability of the various machines to certain uses varies. The requirements for proper strapping reinforcement, the need for training in proper shipping technique, and the prerequisites of strapping are discussed. The importance of the work done before strapping and the need for strapping in domestic as well as in export shipping are emphasized. R.R.

STRAW

M. L. K. The Kinsley report. Ind. Eng. Chem. 41, no. 10: 10A, 12A, 16A (October, 1949); *cf.* B.I.P.C. 19: 173-4.

Reference is made to the Kinsley process, a modified cooking process for making printing-grade paper from cereal straws, alfalfa or clover hay, western bunch grass, or mixed wood chips with appreciable bark contamination. The cooking liquor is similar to that used in conventional pulping with the addition of about 6-10% of an organic inhibitor (nature not disclosed)

which restricts the action of the chemicals on lignin; the macrostructure of the fibers is broken up, but the microfiber bundles are not dissociated. Most of the lignin remains with the fibers, so that a 55% yield is obtained from straw which contains only 35% cellulose. This high percentage of noncellulosic material in the paper made by the new process is the secret of its application to raw materials having low initial cellulose contents. The nature of the inhibiting additive varies according to the fiber being processed. No sizing is used, since the high percentage of noncellulosic material performs this function. In straw paper, to counteract the gelatinizing tendency of the fibers, up to 20% dry weight of clay may be added. The different steps of the process and its low cost are discussed briefly. The first application will probably be a plant to use wood chips on the Pacific Coast, which is expected to be completed before the end of the year. E.S.

SULFITE PROCESS—MAGNESIUM BASE

HANSSEN, LEIF J. From a trip to America. Norsk Skogind. 3, no. 8: 195-201 (August, 1949). [In Norwegian; English summary]

The author describes the magnesium sulfite process used by the Weyerhaeuser Timber Co. and the alkali recovery units built by Babcock & Wilcox and Combustion Engineering Co. 11 figures. E.S.

SULFITE WASTE LIQUOR

ANON. Problem child of chemical pulp; new uses for waste liquor from chemical pulp manufacture. World's Paper Trade Rev. 132, no. 13: 822, 824 (Sept. 29, 1949); *cf.* B.I.P.C. 20: 122-3.

Wartime developments in the utilization of sulfite waste liquor, tall oil, and sulfate turpentine are reviewed briefly. E.S.

EMMERSON, DONALD W. New alcohol plant in Canada using waste sulphite liquor. Indian Pulp and Paper 4, no. 1: 70, 72, 74 (July, 1949); *cf.* B.I.P.C. 20: 45.

The process of making industrial alcohol from sulfite waste liquor is briefly reviewed and production at the new plant at Gatineau, Que., which is owned and operated by Commercial Alcohols Ltd., is described. R.R.

LACKEY, H. B., MOYER, W. W., and HEARON, W. M. A new method of isolating conidendrin from sulphite waste liquor. Tappi 32, no. 10: 469-71 (October, 1949).

A method of obtaining conidendrin by precipitation from sulfite waste liquors has been found. This procedure is carried out by mixing with the waste liquor a small amount of one of several organic liquids, and allowing them to stand. After decantation of the waste liquor the solid conidendrin is removed by filtration. The advantages of this procedure are that a large volume of liquor may be treated in simple apparatus, and a relatively pure product is obtained. The practicality of this method of obtaining conidendrin has been demonstrated in a small semiworks plant. Variables involved in the procedures such as the effect of concentration, temperature, amount of sulfur dioxide, and pH of the waste liquor have been studied. A survey of organic compounds satisfactory for carrying out the precipitation was made and the amount of precipitant necessary to obtain maximum yields was de-

termined for the best precipitant, trichloroethylene. Although conidendrin itself has not yet been found of industrial value, its derivatives have shown promise as commercial antioxidants and for pharmacological uses. 4 tables and 11 references. E.S.

SCRIPTURE, E. W., JR. Utilization of waste sulphite liquor in concrete. Paper Trade J. 129, no. 17: 33-7 (Oct. 27, 1949).

Calcium lignosulfonate derived from sulfite waste liquor is a specific dispersing agent for cement. Studies have been made of various physicochemical properties of this compound in view of the influences these might have on cement dispersion. Purity is of importance, as the sugar content of normal liquor adversely affects cement hydration. An almost ideal composition is secured in the fermentation process for the production of alcohol from sulfite waste liquor. Data are presented to show the improvements in such concrete properties as workability, strength, watertightness, and durability through the use of calcium lignosulfonate. 8 references. E.S.

SUNDMAN, JACOBUS. The formation of aldehyde and alcohol yield during the fermentation of sulfite waste liquor. Finnish Paper Timber J. 31, no. 17: 309 (Sept. 15, 1949). [In Swedish; English summary] *cf.* B.I.P.C. 20: 200.

In the manufacture of alcohol from sulfite waste liquor, a considerable amount of acetaldehyde is formed and accumulated during fermentation. This intermediate product is generally not utilized, but returned with the so-called forerun to the fermentation vessels, where it causes a noticeable decrease in yield. Experiments were made for suppressing acetaldehyde formation, but changes in temperature, acidity, or yeast concentration did not bring satisfactory results. However, it was found that when the forerun was added at once at the very beginning of the fermentation process instead of continuously during the entire procedure, a 4% increase in alcohol yield resulted. Tests also revealed that more than an average amount of the forerun should be added, if the waste liquor contained an excess of bisulfite, whereas it would be advisable to store some of it for future use when the bisulfite percentage is below the average. E.S.

SURFACE PHENOMENA

EUVERARD, MAYNARD R., and HURLEY, DANIEL R. Surface tension measurement. Anal. Chem. 21, no. 10: 1177-80 (October, 1949).

By determining the length of an air bubble of given volume in a horizontal tube of known diameter, the surface tension of the material in the tube may be determined. This method is particularly suited for measuring the surface tension of viscous materials for which usual methods of measurement fail. 2 tables, 3 figures, and 4 references. E.S.

TALL OIL

JENSEN, WALDEMAR. Chromatographic analysis of tall oil. II. Determination of free fatty acids. Finnish Paper Timber J. 31, no. 16: 293-4 (Aug. 31, 1949). [In English] *cf.* B.I.P.C. 20: 125-6.

The method (details of which are given) depends on the determination of "neutral matter" chromatographically before and after esterification of

the tall oil. The difference represents the amount of methyl esters of the acids which were originally present as free fatty acids in the oil. The composition of the tall oils (distilled, forefraction, and crude oils) was determined in each case by conventional methods as well as by the chromatographic procedure. The results agree very well in the case of the forerun fraction, and reasonably well in the case of distilled tall oil. With the crude tall oil examined, the conventional method gave 49.7% total fatty acids, whereas the chromatographic method gave 44.6% free fatty acids. It should be borne in mind, however, that the two methods are fundamentally different. The conventional procedure involves an analysis of a saponified tall oil, whereas the chromatographic analysis is carried out with the original sample. It is for this reason that "neutral matter" is higher in the chromatographic procedure, and correspondingly lower when determined by the conventional method. The chromatographic procedure is simple and rapid and avoids troublesome emulsions. Complete tall oil analysis (i.e., matter insoluble in petroleum ether, neutrals, free fatty acids, free resin acids, and saponifiable matter) can be carried out within 10.5 hours. 3 tables and 3 references.
L.E.W.

TANNINS

SNOW, E. A., and BAILEY, L. F. Tannin from oak slabs; effects of weathering and extraction temperatures on tannin yield. J. Am. Leather Chemists Assoc. 44, no. 10: 737-44 (October, 1949).

Mixed oak slabs accumulate at sawmills throughout the Tennessee Valley in substantial amounts and offer a potential tannin source. Recent pilot-plant studies have proved that light and heavy leather of good quality can be obtained with this tannin; however, further investigations are needed on certain phases of the problem. In the present article, the results on two of these tests, on the effect of weathering and of temperature and time of extraction on tannin yield, are reported. The exposure of oak slabs to weathering up to one year did not result in leaching losses of practical importance. The tests at different temperatures indicated that commercial extraction of mixed-oak slabs would be most economical at a temperature of approximately 80° C. (176° F.). 12 references.
E.S.

TERPENES

HARPER, S. H. Terpenes. Ann. Repts. on Progress Chem. (Chem. Soc. London) 45: 162-87 (1948, publ. 1949).

The author reviews the important literature on mono- and diterpenes for approximately the last 25 years, although a few earlier references are also mentioned. 67 references.
E.S.

TEXTILE INDUSTRY AND FABRICS—TESTING

GONSALVES, V. E. An inclined-plane yarn-tester with linearly increasing stress. Textile Research J. 19, no. 9: 579-81 (September, 1949).

The principle underlying the operation of the A.K.U. (Arnhem, Holland) inclined-plane tester is discussed, in which not the force exerted on the thread, but the stress in the thread increases linearly with time. A special auxiliary apparatus is required, which continuously corrects the force, depending upon the change in the cross section of the thread under examination (which change results from the increase in length). This auxiliary

apparatus can be added to any normal inclined-plane tester operating with steadily increasing force, thereby changing it to one operating with steadily increasing stress; it is particularly useful for stress-strain studies. 2 figures and 3 references. E.S.

TRANSPARENT CONTAINERS

MACRAE, F. J. Plastic containers. Univ. Illinois Bull. Eng. Exp. Sta. Circ. Ser. No. 56: 210-14 (April, 1949).

The author presents a general discussion of the use of thermoplastic resins for containers and describes typical rigid, semirigid, and flexible packages. R.R.

ULTRASONICS

ANON. Wall-thickness of pulp digesters "read" 200 times at same cost as drilling 4 test holes. Chem. Processing Preview 12, no. 10: 14-15 (October, 1949).

The use of the "Audigage," a small portable instrument employing a non-destructive ultrasonic method, is described for checking the erosion and corrosion on digester walls at Crossett Paper Mills, Crossett, Ark. A complete survey (about 200 readings) of each digester is made in about six hours; the thickness of the wall is measured from the inside of the vessel by determining the frequency at which resonance of the ultrasonic waves occurs. The instrument readings were found to check very closely with micrometer readings at drilled test holes. The Audigage is made by Branson Instruments, Inc., Stamford, Conn. E.S.

WATER-MARKS

GOW, HAMISH. Watermarks. Indian Pulp and Paper 4, no. 1: 48-9 (July, 1949).

A discussion is presented of the development of watermarks, their possible significance, and some of the designs which have been used. R.R.

WAXES

NELSON, W. L., and STEWART, L. D. Effect of oil on plastic properties of petroleum waxes. Ind. Eng. Chem. 41, no. 10: 2231-8 (October, 1949).

Oil has a profound effect on the properties of petroleum wax, particularly the microcrystalline waxes. Thirty blends of technical white oil with three typical waxes were examined with respect to solid (melting) point, penetration, crystallinity index, plastic point, ductility, tensile strength, compressive strength, and flexibility. Equipment and testing procedures were developed for most of the property tests, although several of the test methods are only modifications of somewhat standard methods. Equipment and procedure for a flexibility test have been developed whereby a wax stick is bent through a 60° angle until rupture occurs. Compressive strength was found to be more dependable than tensile-strength tests. Oil appears to enter the space between the interlocking crystals of paraffin wax, altering the structure only by dissolving some of the wax, whereas oil enters and dilutes the continuous phase of microcrystalline waxes, gradually altering the properties of the wax and possibly precipitating additional microcrystals. Only with extremely hard or high-melting microcrystalline waxes does oil improve the plasticity or flexibility of a wax. 5 tables, 11 figures, and 21 references. E.S.

WELDING

CLERMONT, CLAUDE. Safety in oxy-acetylene welding. Pulp Paper Mag. Can. 50, no. 10: 173-4, 176, 178, 180 (September, 1949).

Directions for the prevention of welding and cutting hazards when using the oxyacetylene flame are given. 3 references. E.S.

WOOD

FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS. Pulpwood, current consumption and future outlook—a report by FAO to the Montreal Conference. Unasylva 3, no. 5: 178-83 (September-October, 1949); Paper Trade J. 129, no. 18: 23-7; no. 19: 26, 28 (Nov. 3, 10, 1949).

The estimated world production of pulpwood increased by 19% from 1937 to 1947. About 56% of the world's supply was produced in North America, 26% in Europe, 16% in the U.S.S.R., and 2% in all other regions. The 1947 output in countries reporting to the Food and Agriculture Organization is tabulated. The major international movement of pulpwood in 1947, involving about 5,000,000 cu. m. of roundwood, was from Canada to the United States; France was the second largest importer. From the data presented, it seems that each major region of the world must rely primarily for its supplies on its own forests. A summary is given of the outlook for pulpwood supplies in European countries and Europe as a whole, the U.S.S.R., Canada, the United States, Japan, the Union of South Africa, Australia, and New Zealand. The world outlook is considered and the need for improved forest inventories is emphasized. R.R.

WOOD—DECAY

ANON. Protection with chemicals; how it is done at Gaylord Container Corp. Pulp & Paper 23, no. 11: 78, 80 (October, 1949).

Nine years of spraying southern pine pulpwood with a control chemical to offset the effects of sap stain and mold have shown that the treatment is successful for a definite storage period. If the ends of the wood are sprayed with a Dowicide S mixture in the late spring and summer, the wood can be stored safely for four months, in comparison with three for untreated wood; in the fall and winter, the sprayed stock can be held five or six months compared with four months for the unsprayed wood. A mixture of 50 pounds of Dowicide in 250 gallons of water, sprayed through a small-diameter pipe about five feet long, branching into three half-inch spray nozzles, takes care of about 100 truck loads of pulpwood daily for two weeks. R.R.

WOOD OPERATIONS

KOSKI, O. O. Pulpwood handling in the Lake States. Paper Trade J. 129, no. 15: 35-8 (Oct. 13, 1949).

Pulpwood handling in the Lake States has become a vast operation in the bulk movement of raw material from the forests to the numerous conversion plants. The author covers the various steps necessary and equipment used in pulpwood handling, and gives a general idea of the methods and the equipment employed to supply the Lake States pulp, paper, and paperboard mills with their important raw material. E.S.

LEMAY, P. V. Mechanical logging. Pulp Paper Mag. Can. 50, no.. 10: 158, 160, 162, 164, 166, 168 (September, 1949); *cf.* B.I.P.C. 19:439.

The author discusses the present status of mechanized logging as practiced by Marathon Paper Mills of Canada Limited, the machines used, and the effect on the forest. The article is similar to the previous one. E.S.

LE MENESTREL, HENRI, *and others.* Discussion on wood handling. Bull. assoc. tech. papetière 3, no. 4: 59-71 (September, 1949). [In French]

The practical experiences of industrial men in handling pulpwood are discussed informally. L.E.W.

WOOD-STEAMING VESSELS

KÖGEL, LUTZ. Acid-resistant ceramic lining of wood-steaming vessels. Das Papier 3, no. 15/16: 313-17 (August, 1949). [In German]

Directions for the correct lining of iron wood-steaming vessels with acid-resistant bricks are given. Two methods are described. One consists of a primary layer of concrete applied by spraying and a secondary layer of acid-resistant bricks, which will also withstand changes in temperatures; the other involves the use of two brick layers. For filling the cracks in the top layer a synthetic resin cement is employed in both cases. The covering of manholes or removable lids, the correct gradual and complete drying of the lining, and the breaking-in of the newly lined steaming vessel are outlined. The durability and safety of the lining depend upon the care with which the first steaming cycles are conducted. Slow admission of the steam is essential; each of the first three cooking cycles should be extended to a period of at least 48 hours. 10 figures. L.E.W.

WOOD WASTE

SCIENTIFIC CREATORS, INCORPORATED, *South Kearney, N.J.* Wood waste moldings find new markets. Modern Plastics 27, no. 2: 90-1 (October, 1949); *cf.* B.I.P.C. 19: 462-3.

Scientific Creators, Inc., a division of the Decorative Cabinet Corp., is rapidly expanding its molding operation to produce Xon products from sawdust, a thermosetting resin, fiber fillers, and chemical additives to promote good flow during molding. Formulations vary widely; the resin content may be 3 to 25%, depending on the density and strength required in the finished product, the type of waste, resin, and filler used, and the moisture content of the waste, which varies from 5 to 20%. The powder mixture is hand packed in the mold and heated at 225 to 275° F. and 500 to 2500 p.s.i. for 1 to 15 minutes. The wood waste-resin product can be used as core sections and covered with plastic materials for large pieces or as low-cost small pieces of special sizes and styles machined from blanks. Molded hamper tops, coat hangers, shoe lasts, and flat boards are among the products made. R.R.

X-RAY RESEARCH

HERMANS, P. H., and WEIDINGER, A. The degree of crystallinity in native and regenerated cellulose fibres following from x-ray analysis. Bull. soc. chim. Belges 57: 123-35 (1948). [In English] *cf.* B.I.P.C. 18: 719-20.

Numerous attempts have been made recently to obtain quantitative information on the degree of crystallinity of partially crystalline substances such as cellulose. X-ray examination is a desirable method because by definition the crystalline part is that fraction of the substance which gives rise to selective diffraction of x-rays. In the present work the technique was partly borrowed from J. M. Goppel (Thesis, Delft, 1946), but modified and improved. The procedures used for obtaining the intensity measurements and for separately identifying the radiation selectively diffracted by the crystalline portion and that diffusely diffracted by the amorphous portion are described. It is necessary to correct the diffusely diffracted or background radiation for incoherent diffracted radiation (scattering caused by the Compton effect and thermal motion) and for radiation scattered by the air in the camera, before the diffraction associated with the amorphous portion can be measured. Experimental results for a number of types of native and regenerated celluloses are given, and the degree of crystallinity is calculated. The values are 69 ± 2% for native cellulose and 39 ± 3% for rayons, in reasonable conformity with deductions from other physical methods. The relative amounts of amorphous material, referred to that of cotton as unity, calculated from these x-ray data are compared with those computed from moisture-sorption isotherms; the agreement is good. Grinding rayon in the bonedry state yields powders which give an almost amorphous x-ray diagram. The present method indicated a crystalline fraction of 0.09. The powder recrystallized on wetting. Calculations from the measured heat of wetting, compared with that of rayon, gave a value for the heat of crystallization and, hence, the fraction which had recrystallized. This amounted to 0.31, as expected from the previous x-ray measurements on rayons. 3 tables, 8 figures, and 11 references. M.A.H.

Patent Section

Although the abstracts of the United States patents are prepared from the patents themselves, the initial selection of the patents to be abstracted is made from the Patent Gazette *and, therefore, it is possible that the patent section will not contain all patents of potential interest to the industry. The abstracts of the Canadian patents are prepared from the claims published in the* Canadian Patent Office Record. *In so far as possible, an attempt will be made to indicate patents issued in both countries.*

The patent abstracts are listed under the various headings currently used for the abstracts of periodical articles.

Printed copies of United States patents can be obtained from the Commissioner of Patents, Washington, D.C.; the price is 25 cents per copy. Canadian patents up to and including December, 1948, are available only as manuscripts or photostatic copies and an estimate of the cost of a patent should be obtained from the Commissioner of Patents, Ottawa, Canada, in advance of the order. With January, 1949, printed copies of Canadian patents are available at 25 cents per copy of less than 50 sheets of printed matter. For patents of 50 sheets or over, the price is $1.00 per copy. Until the printing branch is in full operation and up to date, the printing of specifications will be several months behind.

ASPLUND PROCESS

BEVERIDGE, JAMES B., and KEHOE, RICHARD D. Production of pulp from cellulosic material. Canadian patent 460,517. Filed Jan. 19, 1943. Issued Oct. 25, 1949. 24 claims.

This is similar to U. S. patent 2,422,522 (*cf.* B.I.P.C. 17: 666-7), which is a division of U. S. patent 2,323,194, issued June 29, 1943. E.G.S.

BLEACHING

DAY, GEORGE A., and HOOS, BENJAMIN G. Bleaching treatment for cellulosic materials. Canadian patent 460,243. Filed Sept. 19, 1947. Issued Oct. 11, 1949. 13 claims. Assigned to Brown Company.

A method is given for bleaching pulp by suspending the pulp in an aqueous solution containing hypochlorite and chlorite at an initial pH of 9 or above to induce initial action of the hypochlorite on the pulp and then lowering the pH to 5 or below to induce later action of the chlorite on the pulp. E.G.S.

BLEACHING—SEMICHEMICAL PULP

MCEWEN, ROBERT L. Method of bleaching semi-chemical pulps. Canadian patent 460, 244. Filed Jan. 9, 1948. Issued Oct. 11, 1949. 2 claims. Assigned to Buffalo Electro-Chemical Company, Inc.

A method for bleaching pulp which contains a major portion of the lignin of the wood from which the pulp was prepared comprises treating the pulp in an environment containing 0.1-1.75% active chlorine based on the weight of dry pulp and having a pH of 3.5-9.0, and bleaching with alkaline peroxide. E.G.S.

BOARD SPECIALTIES

HUTT, HERMAN H. Three-dimensional display device. U. S.

patent 2,485,830. Filed May 1, 1946. Issued Oct. 25, 1949. 7 claims. [Cl. 40-126]

Means are provided for supporting articles on, or in connection with the display and for rendering part of the rear wall portion of a transparent or translucent display sheet or sleeve visible at the front of the device. E.G.S.

KESTON, REVA H. Chewed gum receptacle. U. S. patent 2,484,892. Filed May 22, 1946. Issued Oct. 18, 1949. 1 claim. [Cl. 206-37]

A cardboard receptacle is provided with a metal barb for impaling a piece of chewed gum. E.G.S.

OCLASSEN, CHARLES A. Combined package and applicator. U. S. patent 2,486,056. Filed May 9, 1946. Issued Oct. 25, 1949. 1 claim. Assigned to Foster-Milburn Company. [Cl. 128-261]

A single-use applicator is adapted for the administration of medicinal powders, pastes, jellies, or the like. E.G.S.

ZENT, GEORGE L., and ZENT, BERTHA M. Ornamental article holder. U. S. patent 2,484,776. Filed Jan. 6, 1948. Issued Oct. 11, 1949. 4 claims. [Cl. 229-8]

An ornamental bottle holder is designed to enclose and support a bottle or other type of article in package form. E.G.S.

CHLORINE DIOXIDE

DAY, GEORGE A., and FENN, EDWARD F. Process for producing chlorine dioxide. U. S. patent 2,484,402. Filed Jan. 4, 1946. Issued Oct. 11, 1949. 17 claims. Assigned to Brown Company. [Cl. 23-152]

A process for the manufacture of chlorine dioxide comprises reacting an aqueous sodium chlorate solution with hydrochloric acid in a reaction zone, passing the reacted chlorate solution from the reaction zone to an electrolytic cell, increasing the chlorate content of the solution in the cell, and then returning the fortified solution to the reaction zone for further reaction with hydrochloric acid. The equivalent molar ratio H^+/ClO_3^- between the total amount of hydrochloric acid entering the reaction zone at any given time does not exceed one. E.G.S.

DIELECTRICS

FOSTER, NEWTON C. Resinous compositions and use thereof in forming electrical members and laminated products. U. S. patent 2,482,086. Filed April 1, 1944. Issued Sept. 20, 1949. 20 claims. Assigned to Westinghouse Electric Corporation. [Cl. 154-43]

A laminated structure consists of a number of fibrous sheets impregnated with a binder; the binder is composed of a copolymer of 10 to 95 parts by weight of a monomer containing a vinylidene group and 90 to 5 parts by weight of the reaction product of at least one mol of maleic acid or maleic anhydride and one mol of a mixture of castor oil and another vegetable oil. E.G.S.

DISPENSING CONTAINERS

DALSEMER, RHODENA C. Dispensing container. U. S. patent 2,485,816. Filed June 7, 1944. Issued Oct. 25, 1949. 10 claims. Assigned to Siftproof Carton Associates. [Cl. 222-566]

A paper and cardboard container for dispensing tooth powder is described. E.G.S.

FOLDING BOXES

GOLDEN, DAVID. Collapsible carton. U. S. patent 2,484,085. Filed March 20, 1946. Issued Oct. 11, 1949. 3 claims. [Cl. 229-29]

An egg carton is provided in which inwardly or outwardly foldable end or side walls protect the eggs which are placed in cells or compartments at either end of the carton. E.G.S.

HOLES, WILBUR W. Multiple compartment box. U. S. patent 2,483,583. Filed Dec. 23, 1946. Issued Oct. 4, 1949. 12 claims. [Cl. 229-28]

A multiple compartment cardboard box is adapted to be shipped knocked down and readily assembled. E.G.S.

MADDEN, JAMES C., III. Collapsible packaging container. U. S. patent 2,486,045. Filed Nov. 3, 1947. Issued Oct. 25, 1949. 4 claims. Assigned to Consolidated Lithographing Corporation. [Cl. 229-52]

A cardboard container is shaped and constructed to resemble a lantern and is intended for packaging a bottle of whisky or other bottled goods. E.G.S.

INTERIOR PACKING

HUYE, JOSEPH G. Hat packing stay. U. S. patent 2,484,167. Filed Oct. 15, 1945. Issued Oct. 11, 1949. 4 claims. Assigned to Huye Space Saving Box System, Inc. [Cl. 206-9]

A paperboard hat-packing stay is provided with bracing elements which prevent the hat brim from touching or scuffing against the top or body of the stay as the result of accidental dropping or upthrust. A positive corner lock construction is also described. E.G.S.

KINCAID, ELBERT B. Trihedral corner pad. U. S. patent 2,476,197. Filed Feb. 28, 1948. Issued July 12, 1949. 3 claims. Assigned to Container Corporation of America. [Cl. 229-14]

A trihedral corner pad cut from a paperboard blank is used to protect the corners of furniture during shipment. E.G.S.

LIGNIN

BOOTH, ROBERT B., and PICKENS, ROY A. Froth flotation of copper sulfide ores with lignin sulfonates. U. S. patent 2,485,083. Filed Jan. 4, 1946. Issued Oct. 18, 1949. 4 claims. Assigned to American Cyanamid Company. [Cl. 209-166]

A method is given for reducing the copper sulfide minerals content in the tailing from froth flotation; an aqueous pulp of the ore is formed, the

pulp is subjected to flotation in the presence of a promoter (xanthate, dithiophosphoric acid, or dithiophosphate type) and 0.01-0.5 lb./ton of feed of a surface-modifying agent (an alkali or alkaline-earth metal lignin sulfonate) for the copper sulfide minerals, and the resultant froth concentrate is recovered. E.G.S.

MACHINERY—BOARD MACHINES

PERRY, EUGENE L. Apparatus for forming sheet products from paper pulp. U. S. patent 2,484,047. Filed May 29, 1945. Issued Oct. 11, 1949. 3 claims. Assigned to Paper Plastic Products Corporation. [Cl. 92-43]

A method and apparatus are provided for making continuous sheets of paperboard; the sheet may be made of the desired thickness without having either the weakness usually inherent in thick sheets or lack of cohesiveness between layers. The board may be readily dried and impregnated with plastic solutions. E.G.S.

MACHINERY—CONVERTING MACHINERY

ABRAMSON, ALVIN A. Apparatus for manufacturing containers. U. S. patent 2,483,605. Filed Sept. 12, 1945. Issued Oct. 4, 1949. 1 claim. Assigned to Central States Paper & Bag Company. [Cl. 91-55]

Equipment is provided for forming the paper bags described in U. S. patent 2,483,604; see below. E.G.S.

ABRAMSON, ALVIN A. Container and method of making the same. U. S. patent 2,483,604. Filed June 24, 1944. Issued Oct. 4, 1949. 6 claims. Assigned to Central States Paper & Bag Company. [Cl. 93-35]

Methods are provided for the high-speed mass production of waterproof laminated paper bags from a continuous roll of flexible sheet material, which, as it is unrolled, is cut into like sections of predetermined dimensions; each section is successively folded upon itself and marginally seamed. E.G.S.

FLYNN, MELVIN W. Box head labeler. U. S. patent 2,484,701. Filed June 19, 1945. Issued Oct. 11, 1949. 11 claims. [Cl. 216-52]

An automatic box-head labeler is described which removes one shook at a time from a feed magazine and applies a label to the shook before transferring it to a stacker. An operator is required for feeding the magazine and maintaining a stack of labels on the label-supporting platform. A provision is made for accommodating shooks of different sizes and thicknesses and labels of different sizes. E.G.S.

GRAF, PAUL A. Method and apparatus for closing and sealing cartons. U. S. patent 2,485,235. Filed Aug. 17, 1945. Issued Oct. 18, 1949. 5 claims. Assigned to Container Corporation of America. [Cl. 93-36.8]

A method and apparatus are provided for closing and sealing web-corner cartons so as to obtain positive siftproof corners. E.G.S.

SPINALE, FRANK A. Box folding machine. U. S. patent

2,486,074. Filed Nov. 5, 1947. Issued Oct. 25, 1949. 6 claims. [Cl. 93-49]

An automatic mechanism is provided for continuously receiving and manipulating a succession of flattened tomato boxes, or the like, and delivering the opened and locked boxes in condition for immediate packing. E.G.S.

VREDENBURG, EDRIC W. Machine for application of sleeves to valve bags. U. S. patent 2,483,860. Filed July 31, 1945. Issued Oct. 4, 1949. 5 claims. Assigned to St. Regis Paper Company. [Cl. 93-8]

A machine is provided for applying supplemental sheets to valved kraft-paper bags to form sleeves in the respective valves. E.G.S.

MACHINERY—CORRUGATING MACHINE

STAMM, ALFRED J., and TURNER, HAROLD D. Apparatus for corrugating sheet material. U. S. patent 2,481,049. Filed April 16, 1947. Issued Sept. 6, 1949. 9 claims. Dedicated to the free use of the People in the territory of the United States. [Cl. 154-30]

A method and apparatus are provided for corrugating sheet material, such as plywood, veneer, laminated plastics, sheet plastic, or metal sheets, with a minimum of tensile stress. E.G.S.

MACHINERY—DRYERS

BIDWELL, GEORGE L. Apparatus for drying paper. U. S. patent 2,484,676. Filed Nov. 21, 1946. Issued Oct. 11, 1949. 6 claims. [Cl. 34-111]

An apparatus is provided for drying a continuous paper web in such a manner that lateral shrinkage of the web is inhibited during the drying process; the machine is adapted to produce a greaseproof paper web which is of uniform thickness and transparency across the width of the sheet. E.G.S.

MACHINERY—FOLDING MACHINE

THORPE, JAMES W., BUSSELL, SYDNEY W., and HERBERT, SIDNEY J. Apparatus for folding paper and like material. U. S. patent 2,484,390. Filed Feb. 25, 1949. Issued Oct. 11, 1949. 9 claims. Assigned to H. Reeve Angel & Co., Ltd. [Cl. 93-86]

A machine for folding paper and similar material comprises an upper and lower jaw which serve to receive the piece of paper to be folded; each jaw carries several movably mounted folding blades; the first blade on one of the jaws moves into contact with the piece of paper, and then subsequent blades from each jaw alternately engage the paper so that a series of folds with adjacent folds on opposite sides of the paper sheet is formed. E.G.S.

MACHINERY—GUIDE ROLLS

STAEGE, STEPHEN A. Paper machinery. U. S patent 2,484,473. Filed Oct. 11, 1946. Issued Oct. 11, 1949. 14 claims. Assigned to The Black-Clawson Company. [Cl. 74-241]

An automatic operating control is provided for guiding a Fourdrinier wire

or felt to maintain its operation in the proper path of travel; the device responds rapidly to prevent the wire or felt from running off the guide roll and is normally de-energized during the period when the wire or felt is running straight in its normal path. E.G.S.

MACHINERY—MIXING APPARATUS

KARLSSON, KARL A. Pulp treating apparatus. Canadian patent 460,368. Filed April 22, 1948. Issued Oct. 18, 1949. 10 claims.

An apparatus is provided for the preparation of pulp suspensions suitable for treatment in a beater. The pulp is circulated in a cylindrical tank by means of a rotating blade wheel, the shaft of which is mounted near the periphery of the tank. E.G.S.

MACHINERY—PACKAGING MACHINERY

BERCH, SAMUEL H. Vacuum sealing machine. U. S. patent 2,482,609. Filed May 15, 1947. Issued Sept. 20, 1949. 2 claims. Assigned to The Flexible Vacuum Container Corporation. [Cl. 93-6]

Collapsed paper bags with nonre-entrant folds are maintained in hoppers and fed to the machine, where they are opened, shaped, filled, and heat-sealed by a continuous, automatic operation. The apparatus is adapted to food packaging. E.G.S.

RIEMER, JOHN. Packaging apparatus. Canadian patent 460,288. Filed Jan. 12, 1949. Issued Oct. 11, 1949. 8 claims. Assigned to Kraft Foods Company.

A packaging machine consists essentially of a vertically reciprocable mandrel and a box-forming die which is aligned with the mandrel; the carton blank is folded around the mandrel while the latter is positioned in the die. E.G.S.

MACHINERY—PASTING MACHINE

CUPO, WILLIAM J. Carton handling apparatus. U. S. patent 2,485,040. Filed May 5, 1945. Issued Oct. 18, 1949. 10 claims. Assigned to Waldorf Paper Products Co. [Cl. 93-6]

An automatic apparatus includes means for creating from the exterior of filled cartons a differential in pressure on opposite sides of stacks of closure flaps to hold them securely together while the adhesive sets. E.G.S.

NEAL, MORRIS P. Packaging machine. U. S. patent 2,485,912. Filed Jan. 25, 1946. Issued Oct. 25, 1949. 19 claims. Assigned to A B C Packaging Machine Corporation. [Cl. 93-6]

A packaging machine is provided for automatically gluing, folding, and sealing the top and bottom flaps of paper, pasteboard, and cardboard containers. E.G.S.

MACHINERY—PULPERS

DODGE, GEORGE W. Pulper. U. S. patent 2,485,368. Filed Jan. 9, 1947. Issued Oct. 18, 1949. 6 claims. Assigned to The Noble & Wood Machine Company. [Cl. 92-37; changed to 92-20]

Dry material is introduced into the apparatus and submerged in order to wet it in its travel to the repulper units; breaking units give the material a forward movement and disintegrate the fibers. The apparatus is particularly adapted for repulping wet pulp laps and various types of waste, such as broke, dry shavings, waste paper, and the like. This patent is a modification of U. S. patent 1,726,874, issued Sept. 3, 1929. E.G.S.

MACHINERY—SHEET-FEEDING MECHANISM

O'HARA, JAMES T. Method of separating adhering sheets by an air blast. U. S. patent 2,484,641. Filed Oct. 12, 1945. Issued Oct. 11, 1949. 2 claims. Assigned to Western Electric Company, Incorporated. [Cl. 271-26]

An impregnated laminated paper insulating bar is clamped at its ends to a pair of upright supports mounted on a suitable base; a controlled jet of air is manually directed upon the edge of the laminated bar by means of an air gun; the strength of the air jet is adjusted at the gun so that it has sufficient force to separate the laminated paper bar into its individual sheets. E.G.S.

MACHINERY—SIZING MACHINE

MESSINGER, LESTER H. Machine for sizing tubes. U. S. patent 2,485,007. Filed June 23, 1945. Issued Oct. 18, 1949. 16 claims. Assigned to Remington Arms Company, Inc. [Cl. 93-83]

A machine is provided for sizing paper tubes for shot shells at a rapid rate; it is adapted to size both smooth-surfaced and fluted tubes and to accommodate tubes of different size simultaneously. E.G.S.

MACHINERY—SLITTERS AND WINDERS

CLEM, EVERETT W. Apparatus for unwinding and winding web material. U. S. patent 2,486,006. Filed May 31, 1945. Issued Oct. 25, 1949. 8 claims. Assigned to Rice Barton Corporation. [Cl. 242-65; changed to 242-58]

An unwinding-winding apparatus is provided in which a roll of paper may be unwound at a given rate and rewound on another roll at a desired peripheral rate; the paper is held under a controlled positive or negative tension between the unwinding and winding zones. E.G.S.

MACHINERY—SPREADERS

CORN, WILLIAM H. Web spreading device. U. S. patent 2,486,121. Filed Jan. 24, 1947. Issued Oct. 25, 1949. 5 claims. Assigned to Ecusta Paper Corporation. [Cl. 271-2.1; changed to 242-75]

A spreading device is provided for avoiding wrinkles in a traveling paper web as it passes through a web-winding machine. E.G.S.

MOLDED PULP ARTICLES

ALFREDS, TORRIS H. Egg packing material. U. S. patent 2,483,607. Filed Dec. 7, 1946. Issued Oct. 4, 1949. 7 claims. Assigned to Mapes Consolidated Manufacturing Company. [Cl. 217-26]

A molded pulp pad for egg crates is provided with pickup projections which facilitate manual handling of the pad from above. E.G.S.

PAPER—COATED (HOT-MELT)

RHODES, PHILIP H. Production of adhesive carrier film and utilization thereof. Canadian patent 460,286. Filed Oct. 14, 1947. Issued Oct. 11, 1949. 23 claims. Assigned to Koppers Company, Inc.

A heat-reactive adhesive carrier film for hot pressing work consists of an impregnated film carrier containing a dry unset mixture of hexamethylenetetramine and a permanently fusible dihydroxybenzene-aldehyde resin; when the mixture is dissolved in water, a resin solution is formed which has a pH of 7-9; the resin-impregnated film is unaffected by variations in atmospheric humidity and contains sufficient moisture to cause the resin content of the film to flow during hot pressing. E.G.S.

PAPER AS A TEXTILE MATERIAL

LAMBERT, ERNEST E. Twisted paper thread and method of and apparatus for twisting the same. U. S. patent 2,486,037. Filed Nov. 16, 1946. Issued Oct. 25, 1949. 19 claims. Assigned to Patchogue-Plymouth Mills Corporation. [Cl. 57-31; changed to 57-12]

A method and apparatus are applicable to the manufacture of variegated threads from paper ribbons of different colors; the threads are subsequently used in the manufacture of woven paper-fiber rugs. E.G.S.

PAPER SIZING

McEWEN, ROBERT L. Paper finishing. Canadian patent 460,245. Filed Jan. 9, 1948. Issued Oct. 11, 1949. 9 claims. Assigned to Buffalo Electro-Chemical Company.

A method of sizing and bleaching a paper sheet comprises preparation of an alkaline peroxide solution which contains a dispersion of wax, addition of the aqueous dispersion to a formed paper sheet prior to drying the sheet, and passage of the treated sheet over heated drying rolls. E.G.S.

PAPER SPECIALTIES

CRANSHAW, HAROLD B. Folded blank cup. U. S. patent 2,485,704. Filed Oct. 5, 1944. Issued Oct. 25, 1949. 1 claim. Assigned to Burnitol Manufacturing Co. [Cl. 229-24; changed to 229-25]

A folded paper cup made from a single sheet is designed for use as a sputum cup. E.G.S.

CRAVENS, LAWRENCE F. Combined time record and payroll envelope. U. S. patent 2,485,261. Filed Dec. 7, 1945. Issued Oct. 18, 1949. 1 claim. [Cl. 282-25]

A description is given of a combination payroll envelope and time card. E.G.S.

DESJARDINS, ONÉSIME. Wall construction. Canadian patent 460,356. Filed April 20, 1949. Issued Oct. 18, 1949. 3 claims.

A wall structure consists of an exterior layer of brickwork, an interior layer of hollow tilework, and an intermediate layer of planking; the surfaces of the planking are papered with an oil-impregnated waterproof building paper. E.G.S.

EBEL, CLARENCE J., and DREW, RICHARD G. Pressure-sensitive adhesive tape. U. S. patent 2,484,938. Filed Oct. 4, 1943. Issued Oct. 18, 1949. 3 claims. Assigned to Minnesota Mining & Manufacturing Company. [Cl. 260-19]

A pressure-sensitive adhesive which is applied to a treated paper backing is formulated as follows: 300 parts (by weight) of bodied dehydrated castor oil (heat-bodied to 1000 centipoises at 302° F.), 60 parts of pale wood rosin, 5 parts of light calcined magnesium oxide, and 30 parts of Bakelite resin No. 14,634 (an oil-soluble, heat-reactive phenol-aldehyde synthetic resin from the Bakelite Corp.). E.G.S.

HERMANSON, WILLIAM A. Heat sealed bag. U. S. patent 2,475,241. Filed Feb. 1, 1945. Issued July 5, 1949. 6 claims. [Cl. 206-0.5]

A heat-sealed bag is adapted to contain a deodorant, insecticide, dehydrant, or the like; one or both sides of the bag may be made of wet-strength paper, and one side may be creped and used in conjunction with a heat-sealing web. E.G.S.

KELLGREN, WALDO. Pressure-sensitive adhesive sheet. Canadian patent 460,124. Filed May 23, 1946. Issued Oct. 4, 1949. 11 claims. Assigned to Minnesota Mining & Manufacturing Company.

A pressure-sensitive adhesive sheet or tape consists of a flexible, porous paper backing impregnated and unified with a water-insoluble, flexible, elastic alkyd resin composition, and a water-insoluble, normally tacky, pressure-sensitive, nonoffsetting adhesive coating firmly united to one side of the paper backing. When initially introduced into the paper, the resin is xylol-soluble and has not reacted sufficiently to form a self-sustaining film when coated on a surface without heating; however, the composition sets up on application of heat to produce a self-sustaining elastic film having a modulus of elasticity of about 70 p.s.i. at 50% elongation; the resin is heated *in situ* in the paper. E.G.S.

LACEY, ROBERT T. Seal conveyed letter opener. U. S. patent 2,482,080. Filed Dec. 30, 1946. Issued Sept. 13, 1949. 9 claims. [Cl. 229-85]

A miniature letter opener is attached to the back of an envelope by means of a gummed seal. E.G.S.

LARSON, ADOLPH J. Pack of abrasive coated sheets. U. S. patent 2,485,295. Filed Sept. 17, 1947. Issued Oct. 18, 1949. 2 claims. [Cl. 206-56]

An abrasive-coated strip or sheet consists of a paper carrier or base sheet and a pressure-sensitive adhesive on its bottom or nonabrasive surface; the

strip or sheet may be formed around and attached to a suitable supporting element for use by diemakers in polishing die-mold cavities. E.G.S.

MARCHANT, REYNOLDS. Coated abrasive article and method of producing same. Canadian patent 460,614. Filed Feb. 18, 1943. Issued Oct. 25, 1949. 15 claims. Assigned to Minnesota Mining & Manufacturing Company.

An insoluble resin-bonded coated abrasive sheet is produced by applying a heat-convertible (phenol-aldehyde, alkyd, urea-aldehyde, thiourea-aldehyde, or melamine-aldehyde) resin to a fibrous cellulosic backing strip, applying a layer of silicon carbide particles to the resin-coated strip, placing the strip in a high-frequency (50-80 megacycles) alternating electric field, and heating the particles and binder uniformly by controlling the frequency of the field. E.G.S.

MORGAN, BURTON D. Surgical dressing. U. S. patent 2,484,045. Filed Oct. 6, 1947. Issued Oct. 11, 1949. 4 claims. Assigned to Johnson & Johnson. [Cl. 128-156]

An extensible bandage is provided which can be extended without fraying; the raw edges of the frayable fabric pad are folded inwardly, adhered to the adhesive, shielded under a uniform exposed layer of fabric, and adapted to unroll on extension of the carrier strip without limiting its extension. The carrier strip can be made from cloth, paper, or synthetic films; the adhesive is of the pressure- or solvent-sensitive type. E.G.S.

PARDEE, EDWARD A. Method of folding and sealing sheet material. Canadian patent 460,152. Filed July 4, 1947. Issued Oct. 4, 1949. 4 claims. Assigned to Shellmar Products Corporation.

This is the same as U. S. patent 2,432,122; *cf.* B.I.P.C. 18: 343-4. E.G.S.

QUINN, ROBERT G., and HARKNESS, JOSEPH C. Dielectric sheet and method of manufacture. U. S. patent 2,485,458. Filed March 28, 1944. Issued Oct. 18, 1949. 8 claims. Assigned to Johns-Manville Corporation. [Cl. 92-21]

A tough flexible dielectric sheet has an asbestos paper base which consists of a waterlaid felt of soft, curly chrysotile fibers and straight, harsh fibers belonging to the group consisting of harsh chrysotile and tremolite asbestos; the felt is bonded with 5-10% of its weight of a polyvinyl resin binder; the interstices of the paper are filled with 60-200% (based on the weight of the base paper) of a thermoplastic waterproofing impregnant. E.G.S.

READ, ARTHUR. Milk carton. Canadian patent 460,215. Filed Dec. 11, 1946. Issued Oct. 11, 1949. 2 claims.

A milk container includes a cream chamber in the upper portion of the carton; a rotatable apertured disk in the bottom of the cream chamber permits the cream to be poured separately from the milk. E.G.S.

SALFISBERG, LEROY L. Package. U. S. patent 2,484,749. Filed Feb. 26, 1946. Issued Oct. 11, 1949. 3 claims. Assigned to Ivers-Lee Company. [Cl. 206-56]

A package whose walls are formed of paper or other thin flexible material includes an envelope or bag having sheets of flexible material sealed together to form walls and hinged cover flaps attached to the envelope. The container may be used for packaging medicines and the like. E.G.S.

WATSON, FREDERICK K., and ARTHUR, PAUL, JR. Pressure sensitive adhesives. U. S. patent 2,485,248. Filed July 14, 1945. Issued Oct. 18, 1949. 6 claims. Assigned to E. I. du Pont de Nemours & Company. [Cl. 117-122]

A pressure-sensitive adhesive sheet consists of a greaseproof paper backing having one side coated with an ethylene-vinyl acetate copolymer; the mol ratio of ethylene to vinyl acetate is within the range of 2:1 to 4:1; the copolymer is admixed with about 0.05 to 0.25 part by weight of octadecandiol diacetate as a tackifier, per part of copolymer. E.G.S.

PAPER SPLICING

ROESEN, OSCAR C. Web splicing. Canadian patent 460,511. Filed Nov. 21, 1945. Issued Oct. 18, 1949. 17 claims. Assigned to Wood Newspaper Machinery Corporation.

A web-splicing apparatus is provided with rotary means for accelerating a new web roll to a surface velocity approximating the speed of the running web. E.G.S.

PLASTICS—PAPER-BASE

ADAMS, DOUGLAS D., ROLLIUS, KARL, and RISHER, JOHN D. Continuously forming fibrous materials. U. S. patent 2,486,091. Filed Oct. 16, 1946. Issued Oct. 25, 1949. 12 claims. Assigned 76.89% to R. E. MacKenzie and 23.11% to L. V. Bockius. [Cl. 154-1]

A process is described for continuously forming laminated channel structures from corrugated paper strips. E.G.S.

PATTERSON, DONALD G. Resin for low-pressure paper base laminates and wood surfacing. U. S. patent 2,486,201. Filed March 2, 1945. Issued Oct. 25, 1949. 1 claim. Assigned to American Cyanamid Company. [Cl. 260-45.3]

One component is prepared by blending 55 parts of an unsaturated alkyd resin with 45 parts of styrene, and the other component is prepared by blending 80 parts of methylated melamine-formaldehyde resin with 20 parts of styrene. Eighty-five parts of the first component and 15 parts of the second are blended to form a homogeneous composition; about 0.2-0.5% of lauroyl peroxide and 0.1-0.5% of methyl acid pyrophosphate are added to this composition. The resulting material is used to impregnate a paper sheet about 0.005 inch thick; the resin content is adjusted to about 60%. Several plies of the impregnated paper are placed in a press between polished metal plates at a pressure of 50 p.s.i. and a temperature of 105° C. for 10 minutes. A translucent laminate with high impact strength is produced. E.G.S.

SEMI-CHEMICAL PULPING PROCESS

BEVERIDGE, JAMES B., and KEHOE, RICHARD D. Method and apparatus for the production of pulp from cellulosic material.

Canadian patent 460,518. Filed May 18, 1945. Issued Oct. 25, 1949. 20 claims.

A semichemical process is carried out in a closed chamber at a temperature above 212° F. and at a superatmospheric pressure. Material is pressure-fed to the chamber and discharged in such a manner that temperature and pressure are maintained within the chamber. A quantity (up to 10%, based on the dry weight of the input to the chamber) of a sulfur dioxide-containing compound of sodium, calcium, magnesium, and/or ammonia is added, sufficient to produce a pulp with a pH of 3.9. E.G.S.

SHIPPING CONTAINERS

CHEYNEY, LA VERNE E., and MCCUTCHEON, ROBERT J. Lightweight container. U. S. patent 2,484,608. Filed Nov. 30, 1945. Issued Oct. 11, 1949. 1 claim. Assigned to Wingfoot Corporation. [Cl. 229-14]

A hollow re-usable container of extremely light weight is provided for the shipment and storage of perishable commodities such as foods, flowers, medicine, and the like, which are to be maintained at a low temperature for considerable periods of time. The container consists entirely of rubber hydrochloride film and lightweight insulating material (e.g., expanded urea-formaldehyde resin) which is sealed in the film. The container may be slipped into a snugly fitting cardboard or other rigid container. E.G.S.

DUBINER, BETTY V. Combined shipping and display container. U. S. patent 2,483,533. Filed Dec. 2, 1944. Issued Oct. 4, 1949. 2 claims. [Cl. 206-45.19]

A standard knock-down, end-opening container may be used for shipping and displaying various commodities and for storage of the commodities in the home; a suggested application is the packaging of toys, such as dolls' dishes. E.G.S.

JOHNSON, ALEXANDER H. Container. U. S. patent 2,483,464. Filed Dec. 4, 1945. Issued Oct. 4, 1949. 1 claim. Assigned one half to Frederick T. Johnson. [Cl. 229-22]

The blank for a container with a triangular cross section may be cut from a single sheet of cardboard or similar material; the triangular construction provides strength and permits the containers to be nested. The container is designed for the shipping, storing, and dispensing of liquids. E.G.S.

KUEHLHORN, BERT O. Hot food carton. U. S. patent 2,486,178. Filed Nov. 16, 1946. Issued Oct. 25, 1949. 5 claims. [Cl. 229-14]

A corrugated or fiberboard container is adapted to hold hot food or other articles; the liner is constructed to receive a heating element or the like. E.G.S.

STETSON, JOHN C. Shipping carton. U. S. patent 2,483,481. Filed June 21, 1946. Issued Oct. 4, 1949. 2 claims. Assigned to John C. Stunkel. [Cl. 229-23; changed to 229-49]

A corrugated shipping carton is provided with reinforcing members which are arranged within the carton to strengthen the walls for added protection of the contents. E.G.S.

VAN SAUN, RAYMOND H. Shipping container. U. S. patent 2,484,975. Filed Nov. 22, 1948. Issued Oct. 18, 1949. 1 claim. Assigned to California Container Corporation. [Cl. 229-23]

A paperboard shipping container is formed of three parts and is reinforced at the end and top edges so that relatively light material may be used for its construction. E.G.S.

SULFITE WASTE LIQUOR

NYMAN, CARL H. Method of treating scale forming liquors. U. S. patent 2,484,046. Filed March 2, 1943. Issued Oct. 11, 1949. 1 claim. [Cl. 260-124]

A method is given for treating scale-forming liquors to render the scale readily removable with relatively inexpensive solvents; a finely dispersed suspension of calcium sulfite is established in the liquor, the liquor is heated, and the calcium sulfite particles are allowed to deposit together with the scale-forming components; the resulting scale is removed with weak acid solutions. E.G.S.

TALL OIL

KOONCE, SAMUEL, and PERRY, EDMOND S. Treatment of tall oil and portions thereof. U. S. patent 2,485,744. Filed Sept. 20, 1946. Issued Oct. 25, 1949. 3 claims. Assigned to Distillation Products, Inc. [Cl. 260-97.6]

Tall oil is treated with methyl alcohol in the presence of an esterification catalyst, the esterified mixture is dissolved in a suitable solvent, the solution is contacted with an adsorbent, and the adsorbent is washed with a weak eluting solvent to remove the methyl esters of fatty acids and subsequently with a stronger eluting solvent to remove the rosin acids. E.G.S.

VAN VALKENBURGH, EDWARD A. Tall oil acid composition. U. S. patent 2,483,797. Filed Nov. 23, 1948. Issued Oct. 4, 1949. 6 claims. [Cl. 260-97.5; changed to 106-123]

A tall oil acid composition consists of 80-90% of a mixture of free tall oil acids and aliphatic amine soaps of tall oil acids, and 10-20% of a compatible liquid hydrocarbon solvent; the composition is free from uncombined amines. The acid and soap contents each represent more than 10% of the acid-soap mixture. An amylamine, butylamine, or tetraethylpentamine soap may be used. E.G.S.

VANILLIN

PEARL, IRWIN A. Process of preparing vanillic acid. U. S. patent 2,483,559. Filed May 29, 1947. Issued Oct. 4, 1949. 6 claims. Assigned to Sulphite Products Corporation. [Cl. 260-521]

Vanillic acid is prepared by subjecting a lignin substance (e.g., calcium lignosulfonate) at a temperature of at least 50° C. to the oxidizing action of silver oxide in the presence of an aqueous sodium hydroxide solution, acidifying the reaction mixture, extracting the acidified mixture with a water-immiscible vanillic acid solvent, and recovering the vanillic acid from the extract. E.G.S.

WOOD WASTE

GOSS, WORTH C. Sheet lumber. U. S. patent 2,485,587. Filed

Dec. 22, 1945. Issued Oct. 25, 1949. 3 claims. Assigned to United States Sheetwood Company. [Cl. 106-163]

A hard, rigid board comprises a heat- and pressure-consolidated mixture of wood fibers which constitute 60-98% of the mixture, based on the dry weights of materials, and 2-40% of a bonding agent composed of brown rotted wood.

E.G.S.

AUTHOR INDEX TO BOOKS

Adams, R., ed. 153
American Chemical Society 154
Anderson, L. 154
Bakelite Corporation 154
Benedict, M., ed. 153
Bryant, L. C. 154
Canada. Department of Mines and Resources. *Dominion Forest Service.* 155
Canada. Dominion Bureau of Statistics 153
Carbide and Carbon Chemicals Corporation 154
Chemical Society, *London* 153
Craig, R. B. 154
Fort, H. H., comp. 155
Heat Transfer and Fluid Mechanics Institute 154
Huber, J. M., Corporation 153
Lardy, H. A., ed. 154
Loring, H. S., ed. 153
Luck, J. M., ed. 153
Mackinney, G., ed. 153
Moncrieff, R. W. 154
Morris, F. C. 155
Rand McNally & Company 153
Rollins, M. L., comp. 155
Scheffer, T. C. 155
Skau, D. B., comp. 155
U. S. Dept. of Agriculture 154, 155
U. S. Dept. of Agriculture. *Library* 155
U. S. Dept. of Commerce 154
U. S. Office of Domestic Commerce. *Chemicals Division,* comp. 155
Virginia Polytechnic Institute. *Engineering Experiment Station* 155
Weissberger, A., ed. 153
West, C. J., comp. 154
Wheland, G. W. 153
Williams, C., ed. 153
Wisconsin, University 154

AUTHOR INDEX TO ABSTRACTS

The letter P preceding a page number indicates a patent abstract.

A B C Packaging Machine Corporation .....P 218
Abramson, A. A. .....P 216
Ackermann, J. A. 182
Adams, D. D. .....P 223
Aggarwala, J. C. 176, 185
Alander, P. 166
Albrecht, I. 197
Alfreds, T. H. .....P 219
American Cyanamid Company P 215, P 223
Aribert, M. 204
Aries, R. S. 187
Armitage, F. D. 184
Arthur, P., Jr. .....P 223
Axilrod, B. M. 197
Bachmann, A. E. 159
Badger, R. M. 164
Bailey, L. F. 208
Baltz, W. E. 180
Barton, J. S. 159
Bayer, C. 156
Beam, M. J. 191
Berch, S. H. .....P 218
Berkman, B. 184
Beveridge, J. B. .....P 213, P 223
Bhatnagar, S. S. 199
Bidwell, G. L. ..... P 217
Black, W. C. 194
The Black-Clawson Company .....P 217
Blaker, R. H. 164
Bloomquist, W. C. 174
Bockius, L. V. .....P 223
Booth, K. G. 159
Booth, R. B. .....P 215
Böttinger, G. 165
Breitveit, K. V. 163
Broughton, D. B. 183
Brown, K. J. 158
Brown, M. H. 183
Brown, R. H. 183
Brown, R. M. 175
Brown, W. R. J. 168
Brown Company .....P 213, P 214
Browning, B. H. 192
Bryde, Ø. 165, 192
Buffalo Electro-Chemical Company, Inc. .....P 213, P 220
Bulow, C. L. 183
Burnitol Manufacturing Co. .....P 220
Bussell, S. W. .....P 217
Cable, R. S. 162
Cafall, C. 192
Cahners, N. L. 183
California Container Corporation ...P 225
Casey, R. S. 183
Central States Paper & Bag Company P 216
Champlain Company, Inc. 181
Cheyney, L. E. .....P 224
Clem, E. W. .....P 219
Clermont, C. 210
Cleveland, F. C. 204
Cole, E. H. 163
Consolidated Lithographing Corporation .....P 215
Container Corporation of America .....P 215, P 216
Container Laboratories, Inc. 202
Converse, P. D. 183
Cooke, W. 203
Copulsky, W. 187
Corn, W. H. .....P 219
Craig, F. A. 189
Cranshaw, H. B. .....P 220
Cravens, L. F. .....P 220
Crossmon, G. C. 203
Cupo, W. J. .....P 218
Dalsemer, R. C. 215
Dames, C. A. 170
Davidson, J. H. 189
Day, G. A. .....P 213, P 214
Day, W. C. 177
DeLong, W. B. 183
Denne, A. G. 179
Desjardins, O. .....P 221
Distillation Products, Inc. .....P 225
Dixie Cup Company 172
The Dobeckmun Company 162
Dodge, G. W. .....P 218
Dosker, C. D. 199
Dossmann, H. 193
Douglass, P. C. 203
Drew, R. G. .....P 221
Dubiner, B. V. .....P 224
Dunnagen, C. E. 186
du Pont de Nemours, E. I., & Company .....P 223
Eble, C. J. .....P 221
Ecusta Paper Corporation .....P 219
Emmerson, D. W. 206
Ender, A. L. 203
Entwistle, D. 163
Euverard, M. R. 207
Evans, J. C. W. 189
Every, D. 176
Fachkunde-Kartei 191
Fairchild, D. 191
Farney, R. E. 183

Farrelly, W. 180
Fenn, E. F. ..... P 214
Fisher, H. L. 183
The Flexible Vacuum Container Corporation ..... P 218
Flynn, M. W. ..... P 216
Food and Agriculture Organization of the United Nations 210
Ford, C. E. 183
Forsberg, E. 194
Foster, N. C. ..... P 214
Foster, S. L. 183
Foster-Milburn Company ..... P 214
Friend, W. Z. 183
Gair, Robert, Company, Inc. 200
Gallay, W. 160
Gardfors, G. 159
Gavelin, G. 184, 193, 194, 195
Gaylord Container Corporation 200
Geller, J. H. 177
Glass, D. L. 157
Golden, D. ..... P 215
Gonsalves, V. E. 208
Gonser, B. W. 183
Gordon, W. G. 162
Goss, W. C. ..... P 225
Gottlieb, S. 177
Gow, H. 209
Graf, P. A. ..... P 216
Graham, K. 188
Grove, C. S., Jr. 183
Grundy, A. V. 200
Gundersen, F. H. 178
Gustafsson, G. R. 160
Hansen, H. L. 191
Hanssen, L. J. 206
Harkness, J. C. ..... P 222
Harper, S. H. 208
Hearon, W. M. 206
Hecht, S. 168
Hendley, C. D. 168
Herbert, S. J. ..... P 217
Hermans, P. H. 176, 211
Hermanson, W. S. ..... P 221
Heron, A. R. 184
Hiers, G. O. 183
Holes, W. W. ..... P 215
Hoos, B. G. ..... P 213
Hull, J. H. 159
Hurley, D. R. 207
Hutt, H. H. ..... P 213
Huye, J. G. ..... P 215
Huye Space Saving Box System, Inc. P 215
Illinois, University 183
Industrial and Engineering Chemistry 183
International Paper Company, *Container Division* 201
Irwin, H. F. 184
Ivers-Lee Company ..... P 222
Jensen, W. 177, 207
Johns-Manville Corporation ..... P 222
Johnson, A. H. ..... P 224
Johnson, F. T. ..... P 224
Johnson & Johnson ..... P 222
Jonsén, H. 198
Judd, D. B. 169
Karlsson, K. A. ..... P 218
Kehoe, R. D. ..... P 213, P 223
Kellgren, W. ..... P 221
Kerr, R. W. 204
Keston, R. H. ..... P 214
Kincaid, E. B. ..... P 215
Kleinert, T. 177
Kline, G. M. 183
Klouman, G. H. 156
Koenig, J. H. 183
Kögel, L. 211
Köhler, R. 156
Koonce, S. ..... P 225
Koppers Company ..... P 220
Koski, O. O. 210
Kraft Foods Company ..... P 218
Kraske, W. A. 158
Kratzl, K. 178
Kuehlhorn, B. O. ..... P 224
Lacey, R. T. ..... P 221
Lackey, H. B. 206
Laidler, K. J. 169, 170
Laitala, E. 183
Lamb, J. J. 197
Lambert, E. E. ..... P 220
Lane, W. H. 158
Larrabee, C. P. 183
Larson, A. J. ..... P 221
Lathrop, E. C. 196
LeMay, P. V. 211
Le Menestrel, H. 211
Lesser, M. A. 174
Loetterle, F. R. 156
M. L. K. 205
MacAdam, D. L. 168
McCarthy, J. L. 185
McCutcheon, R. J. ..... P 224
Macdonald, R. G. 159
McEwen, R. L. ..... P 213, P 220
McGovern, J. N. 158
McIntosh, R. L. 162
Mackenzie, F. W. 191
MacKenzie, R. E. ..... P 223
McMichael, C. E. 173
MacRae, F. J. 209
Madden, J. C., III. ..... P 215
Madras, S. 162
Malott, D. W. 199
Manning, C. F. 173
Mapes Consolidated Manufacturing Company ..... P 219
Marchant, R. ..... P 222
Martaing, J. 198
Martersteck, P. J. 203
Martin, A. J. P. 167
Mason, S. G. 162
Maxwell, B. 197
Mehta, P. C. 163
Meller, A. 198
Messinger, L. H. ..... P 219
Miller, D. C. R. 200
Minnesota Mining & Manufacturing Company ..... P 221, P 222
Mitchell, J. B., Jr. 202
Mitchell, R. L. 198
Morgan, B. D. ..... P 222
Moriarity, T. F. 202
Morris, M. 162
Moses, S. 157
Mount, J. 202
Moyer, W. W. 206
Murphy, E. A. 175
Murray, R. L. 167
Murto, J. O. 158
Neal, M. P. ..... P 218
Nelson, W. L. 209
The Noble & Wood Machine Company ..... P 218
Nordman, L. 193
Nuki, R. P. 182
Nyberg, B. 200
Nyman, C. H. ..... P 225
Oclassen, C. A. ..... P 214
O'Hara, J. T. ..... P 219
Pacsu, E. 163
Paper Plastic Products Corporation .. P 216
Paper Sales 192
Pardee, E. A. ..... P 222
Parker, P. A. 201
Patchogue-Plymouth Mills Corporation ..... P 220
Patterson, D. G. ..... P 223

Payne, C. R. 183
Pearce, L. C. 181
Pearl, I. A. ..... P 225
Pelczar, M. J., Jr. 177
People in the territory of the United States ..... P 217
Perelygina, A. I. 190
Perry, E. L. ..... P 216
Perry, E. S. ..... P 225
Peters, H. 183
Pickens, R. A. ..... P 215
Pigage, L. C. 183
Porter, C. C. 158
Powers, W. C. 188
Preston, E. W. 175
Pulp & Paper 159
The Pusey & Jones Corporation 179
Quinn, R. G. ..... P 222
Rahm, L. F. 197
Rappaport, S. 181
Read, A. ..... P 222
Reed, H. M. 205
Reed, R. F. 204
Reeve Angel, H., & Co., Ltd., ... P 217
Remington Arms Company, Inc. .... P 219
Reynolds, V. L. 180
Rhodes, P. H. ..... P 220
Rice Barton Corporation ..... P 219
Richter, J. 169
Riemer, J. ..... P 218
Risher, J. D. ..... P 223
Roberts, A. 171
Roehrig, W. H. 183
Roesen, O. C. ..... P 223
Rollius, K. ..... P 223
Ruthon 204
St. Regis Paper Company .....174, P 217
Salfisberg, L. L. ..... P 222
Samuelson, O. 198
Sandermann, W. 178
Schröter, H. 195
Scientific Creators, Incorporated ... 211
Scripture, E. W., Jr. 207
Sell, R. C. 183
Semmett, W. F. 162
Sen, M. K. 176
Sergeant, S. V. 182
Shellmar Products Corporation ..... P 222
Shuler, K. E. 169, 170
Siftproof Carton Associates ..... P 215
Skeen, J. R. 157
Slaughter, J. E., Jr. 173
Smith, J. 174
Snow, E. A. 208
Snyder, S. C. 183
Spahr, J. C. 205
Spencer, G. H. 179
Spinale, F. A. ..... P 216
Staege, S. A. ..... P 217
Stamm, A. J. .....183, P 217
Stein, Hall & Company, Incorporated 204
Steinbauer 180
Stephenson, J. N. 189
Stetson, J. C. ..... P 224
Stevens, W. O. 175
Stewart, L. D. 209
Stunkel, J. C. ..... P 224
Sugihara, J. M. 164
Sulphite Products Corporation ..... P 225
Sundman, J. 207
Swanson, C. E. 183
Tapadar, D. C. 189
Thormann, F. 166
Thorpe, J. W. ..... P 217
Timell, T. 164
Tobler, F. 171
Turk, J. G. 201
Turner, H. D. ..... P 217
Uhlig, H. H. 183
The Union Tool Corporation 181
U. S. Department of Agriculture. *Production and Marketing Administration* 165
United States Sheetwood Company .. P 226
Van Saun, R. H. ..... P 225
Van Valkenburgh, E. A. ..... P 225
Van Wazer, J. R. 174
Verink, E. D., Jr. 183
Visking Corporation 196
Voïtsekhovskiĭ, R. V. 182
Vredenburg, E. W. ..... P 217
Wachter, A. 192
Wåhlin, B. 160
Wakeham, H. 171
Waldorf Paper Products Co. ..... P 218
Wannow, H. A. 166
Watson, F. K. ..... P 223
Weidinger, A. 211
Western Electric Company, Incorporated ..... P 219
Westinghouse Electric Corporation .. P 214
Williams, T. I. 171
Williamson, R. V. 196
Wingfoot Corporation ..... P 224
Winslow, S. L. 183
Witt, R. K. 157
Wolfrom, M. L. 164
Wood Newspaper Machinery Corporation ..... P 223
Wooding, N. S. 163
Woodruff, A. B. 197
Wright, W. D. 167
Wurz, E. 165
Wurz, O. 165
Zent, B. M. ..... P 214
Zent, G. L. ..... P 214

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